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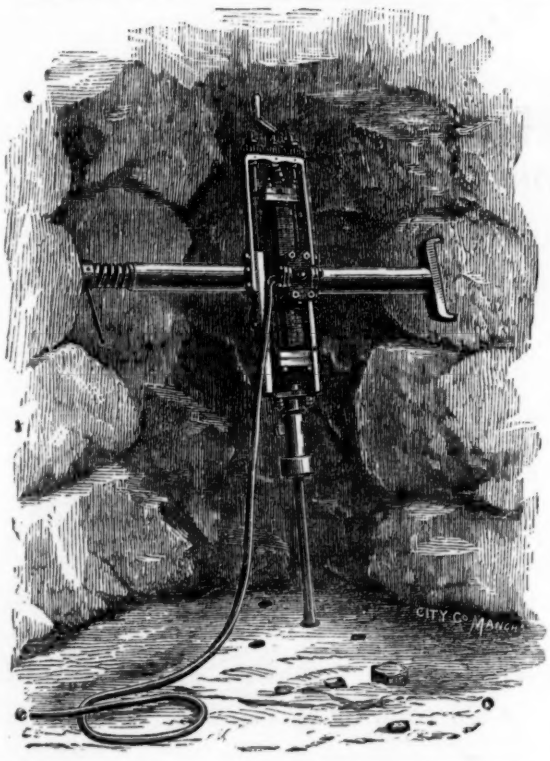

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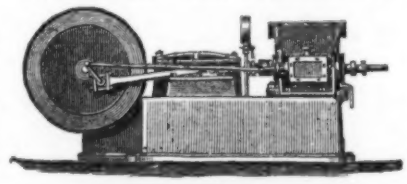

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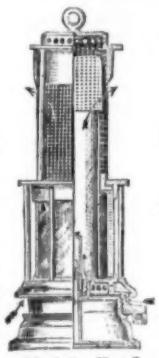

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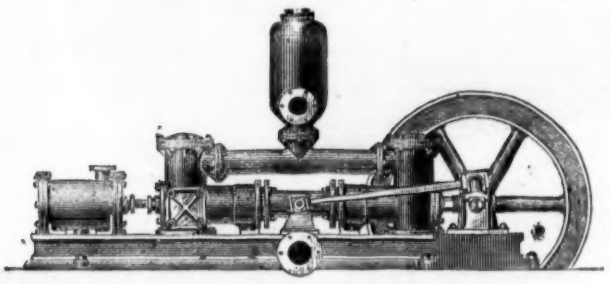

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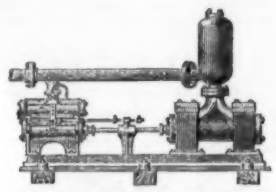

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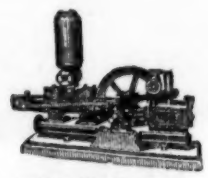

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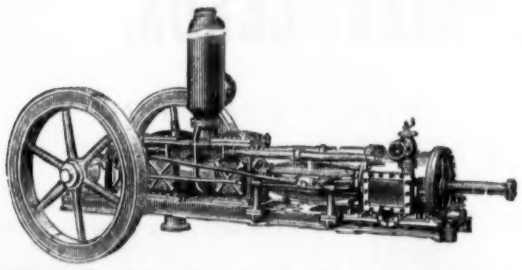

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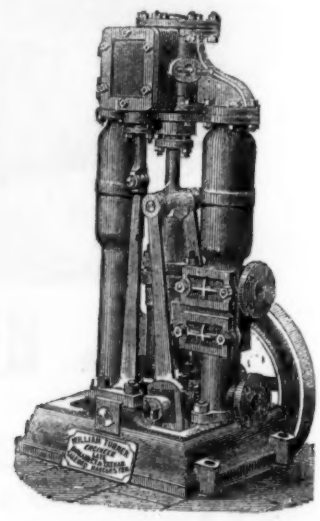

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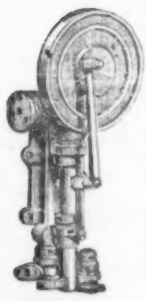

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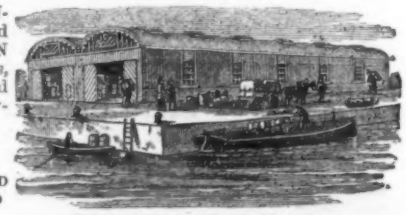

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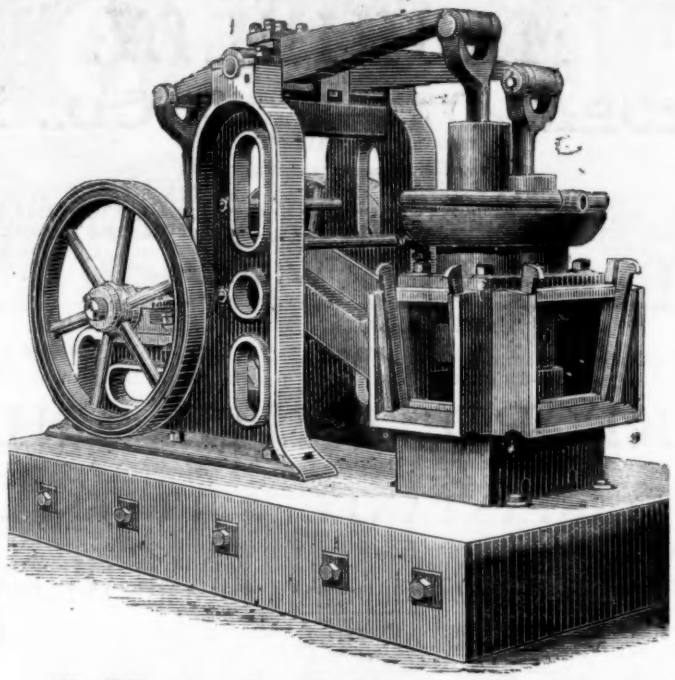

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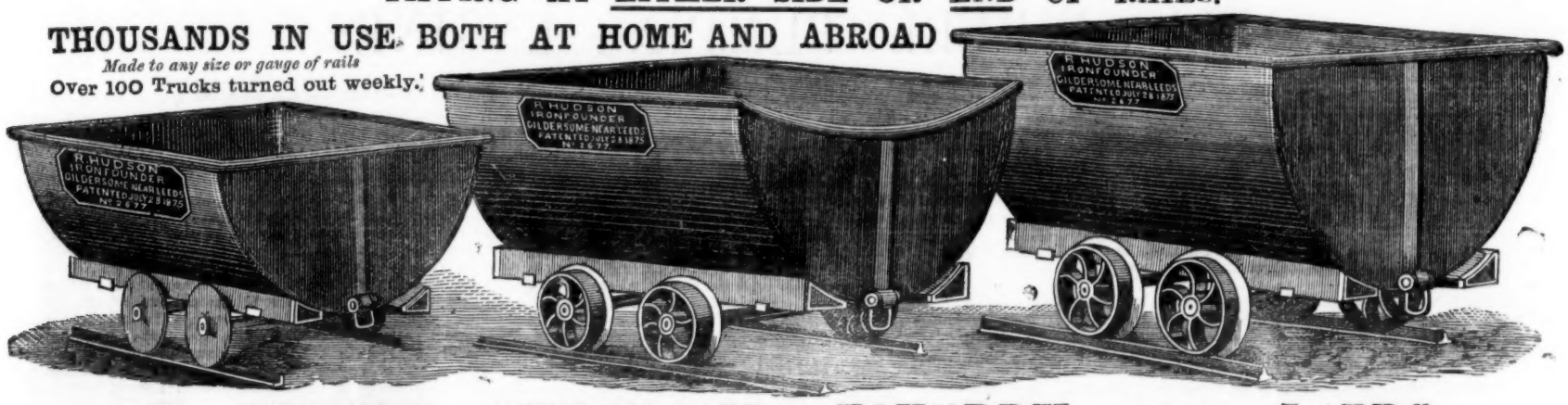

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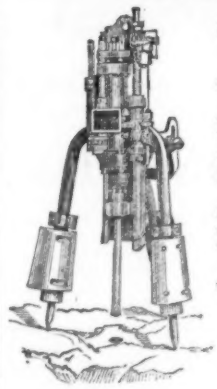

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THE JUBILEE EXHIBITION.

The Royal Cornwall Polytechnic Society is now holding its 50th Exhibition. Founded in the year 1833 on the suggestion of Miss A. M. Fox, daughter of the late Mr. Robert Were Fox, F.R.S., of Peryerrick, whose family at that time carried on the Perran Foundry, it has held from that day to the present a career of consistent usefulness. Fluctuations there have of course been, and at times its activities have seemed to slacken as old friends passed away, but still it has held its ground, and while poly-technic in the fullest sense of the word has always taken a special interest in the progress of mining industry and improvement, it was felt that special efforts should be made to celebrate the Jubilee of the Society, and we are happy to state that these have been most successful. By the aid of sub-committees, and particularly in special departments by hearty individual exertion, what is by far the largest and best exhibition in the annals of the Society has been brought together—one that may fairly be regarded as memorable in the history of the county itself. It will remain open double the usual time—all next week.

For the accommodation of the very large entry in the mechanical department the Drill-hall was engaged, and this is filled absolutely to overflowing. Mr. F. W. Michell, of Redruth, who kindly undertook the charge of the mechanics, has every reason to be satisfied with the issue of his labours. He has been most zealous and untiring in collecting objects of interest, and his practical skill made the best possible arrangements for the working of the machinery in motion, power for which was supplied by a portable engine stationed outside the building.

Relieved as the Polytechnic Hall thus was of the whole of its most important section, it nevertheless proved barely able to find room for the other departments, so enormously had they grown. Photographs were numerous and better than ever. The oil and water colour pictures are of an average high quality never exceeded. Ornamental art, especially in its amateur division, is very strong, and has been much enriched by a fine series of loans from the South Kensington Museum. Two special features may well be noticed here. Messrs. Freeman, of Penryn, exhibit a most elegant fountain in carved and polished Cornish granite. Messrs. Fouracre and Watson, of Plymouth, a fine series of examples of stained glass from their studio. Naval architecture is stronger than it has been for many a long year. The collection of meteorological apparatus is quite an exhibition in itself. Natural history is represented to an extent altogether unprecedented, and "fish, tin, and copper" each have their places therein. Casts and specimens of preserved fish are very numerous, and there is a notable display of fish rearing apparatus, and of various fishing appliances. "Tin and copper" find their representation not merely in a series of mineralogical specimens, but in a very important collection from Dolcoath, by Capt. Josiah Thomas, of examples of lode and country from every level and important point in that famous mine.

It is a difficult thing to review only the most salient points in the Mechanical and Special departments, in which the real interest of the Polytechnic for readers of the *Mining Journal* centres. But, in the first place, special mention is called for, if only in a general way, by the exhibits of the Swan Electric Light Company and of the Messrs. Siemens. The Swan Company carried out the lighting of the Polytechnic Hall, the electricity being supplied by a couple of dynamo machines, worked by an engine in New-street, and electrical lighting formed the topic of a valuable lecture by Professor Leith Adams, F.R.S. Messrs. Siemens were represented by a full series of the most beautifully made and most recent forms of electric telegraphic and allied apparatus and materials. To these and to the special form of the Swan incandescent lamp were given the place of honour in the Polytechnic Hall, a raised staging immediately in front of the platform.

A distinctive feature of the present year's mechanical display is the extent to which it has been wisely sought to make the Exhibition of the Jubilee year a record of progress, by contrasting the best of the past with the best of the present, and by bringing together as many exhibits of what may be called an historic kind as possible. A very large proportion of success has attended this effort, as even the most hasty glance will show. For example, there is the original model of the first man engine in the county, by which Mr. Michael Loam carried off the first prize offered by the Society, and which is now shown by Messrs. Loam and Son. Then there is a notable series sent by Messrs. Harvey, of Hayle, including a model of a double man engine, while Mr. W. Husband among his contributions has the model of his four beat valve. Mr. F. W. Michell lends a set of original drawings by his grandfather of the first engine set up by James Watt in Cornwall, at Ting Tang Mine, in 1778. As the engine came down Mr. Michell, then quite a youngster, made a model of it, and finally these drawings. Accompanying them are autograph letters from Watt and Murdoch.

There are several stamp models of various kinds, some of which are the property of the Society, and there are some which show the earliest attempts to improve the old percussion stamps in ways that have been worked upon in many fashions since. The original model of Oxland and Hocking's calciner is another feature of considerable interest; and hard by will be seen an ancient model of a Cornish pumping engine, made by Mr. S. Bawden, largely of metal smelted and worked by himself from Cornish ores, and interesting, further, as exhibiting the ingenious "sun and planet" wheels by which Watt sought to overcome the obstacles placed in his way to the use of the crank motion. Another model of considerable interest, shown by Messrs. West, illustrates the West and Darlington method of adapting hydraulic arrangement to counterbalancing, and to the accumulation and transmission of power. This, too, embodies recent improvements. A model of "spring helve" stamps indicates a principle which met the approval of the late Mr. West, and which is now about being worked out in practice. The stamps are carried at the end of long horizontal springs, moved by lifters about midway. Thus there is given an elastic blow. The most venerable representatives of ancient ways in the hall was a couple of stones found on Lord C inton's property. One of them is a portion of an old stone stamp bed, fitted on each side with a series of holes, and showing, as it got worn from time to time, how it had been turned over. The other stone is a fragment of the once universal stone crazing mills, the principle of which has been applied from time to time in the construction of some of the wooden pulverisers.

And while mentioning pulverisers we may add to our list of models that of Michell and Tregoning's pulveriser, which obtained the first silver medal, and of which between 30 and 40 are now in work. Side by side with the original is the improved form. The barrel, instead of being cast in one piece, is now made in sections, which conduces alike to economy of manufacture and of wear, and of convenience of carriage. This was not in competition.

Mr. A. Pryor's pulveriser, which came before the judges last year, is shown in model, but the judges were unable to make an award in consequence of the absence of any data as to its actual results. It is a barrel in which the stuff is rubbed down by a heavy weight working eccentrically on the axle.

To Messrs. Tangye, of Birmingham, belong the credit of carrying all the special honour of the Exhibition—the Jubilee gold medal for the best exhibit or series of exhibits in the mechanical or special classes. Nothing at all approaching to the extent and character of the display made by this firm have ever been seen in the West before, for it alone were twice as large and fully as varied as the whole mechanical department has been in some former years. As they went through the machines and beautifully made models shown by Messrs. Tangye, the judges rapidly saw their way clear to the award of several medals of the highest ordinary class to individual exhibits; but when all was completed they were unanimously of opinion that these should all merge in the gold medal as the very highest award of all. This resolution was confirmed by the general committee of judges at their subsequent meeting, for reasons set forth by the judges of mechanics, one of which was that the contributions of Messrs. Tangye showed in the fullest manner the practical record of the general progress made by the arts and sciences, especially in their applied forms, and particularly of inventive skill as applied to the arts, since the Polytechnic was founded. Want of space necessarily compels us to limit our remarks upon this collection, and we shall deal, therefore, chiefly with the items which the judges held in chief favour.

Prominent among these is the Wilson gas producer for firing every description of furnace. The utilisation of the waste gases from furnaces in iron smelting, and the large number of furnaces worked entirely by gaseous fuel have familiarised engineers with its employment for such purposes; and there has been a complete revolution in the method of conducting many of the most important manufactures, for it has been shown that by the use of gaseous fuel coupled with regeneration a saving of 50 to 80 per cent. over the ordinary coal fuel is effected. The speciality of the Wilson gas producer is to reduce the first cost and space required for a given amount of work done, and it gasifies coal at the rate of 26 to 30 lbs. per square foot of hearth area per hour, as against about 13 lbs. of the old type per foot of grate area. The "Wilson" is about 8 ft. in diameter externally, and 10 ft. high. It consists of a wrought iron skin or covering lined with fire brick work, without any grate bars. A box runs across the centre of the hearth, having tuyeres on its sides. Two doors are provided, one on each side of the centre tuyere for removing ashes and clinkers. The air is forced in by two small jets, each blowing down a tuyere pipe. The upper portion of the producer forms a kind of retort with an annular flue communicating with a branch pipe to which the down course is connected, and into which a valve or damper is fitted. Through this pipe the gas is conducted to the gas main or culvert. At the top there is a bell or copper for changing the fuel. When the Wilson producer is set to work a couple of fires are lit on the hearth, the doors are closed and luted, and the interior is charged half full of fuel. Into the centre of this mass near the hearth, and as far as possible from the side walls, air and steam are injected from each side of the central tuyere, which communicates with the steam jet blowers outside. Rapid combustion then takes place in the vicinity of the tuyere, when the carbon is decomposed into carbonic oxide at a bright red-heat, and with the hydrogen also decomposed from the steam passes upwards and escapes by the outlet ports into the annular flue. The coal is charged about every 20 minutes through the bell and hopper. When the top of the coal is kept above the level of the outlet ports as is proper the hydro-carbons are for the most part distilled in the retort portion of the apparatus, and have to burn downwards to escape with the carbonic oxide and the hydrogen from the bottom. Hence the distillation of the hydrocarbon is gradual and uniform, no great flushes of gas occurring at the moment of charging. The tubes and down comers are lined with brick, and underground brick flues are recommended for conveying the gas to the furnaces. No tar is produced and the troublesome substance is all gasified and utilised in combustion. There is a slight deposit of sooty matter in the flues which may be burnt out without trouble. Since the producer was introduced it has been thoroughly tested in action, and upwards of 200 have been sold. They will gasify from 4 cwts. to 8 cwts. of slack per hour, but can be worked at any speed. They are in use for firing boilers, calcining ores, steel melting, puddling and refining iron, in pottery, brick, and chemical works, and in many other ways, and are specially adapted for various matallurgical operations. The award in this case would have been a second silver medal.

Another apparatus set down for a like award is Tangye's vertical boiler feeder, an adaptation of the well-known Special Pump, fitted with a ram 1¼ in. in the cylinder. The action is independent of any defective joints or accidental leakages. It can be fixed against a wall partition or post, occupying little space, and will work at any speed, from 2½ gallons per hour up to 300.

Jeffrey's patent donkey feed pump is a self contained fly wheel horizontal pump, capable of supplying 300 gallons per hour. It has a simple and durable patent valve arrangement, and is designed specially with a view to enonomise steam. A great speed can be attained with the minimum of noise.

Barnes's donkey pump is a horizontal self contained boiler feeder, and somewhat resembles the acceptable type of boiler pump in use in the North of England. It contains many important points, is marine in character, with large bearing surfaces, and is exceedingly durable, while every part is simple and accessible.

The punching bear, too, was much admired in action. It weighs only 64 lbs., but a lad can punch a boiler plate ¼ in. thick in a few seconds. It takes a dead weight of 30 tons.

The "Special" steam pump shown bears the significant number 10,240 (which is alone a proof of its world-wide reputation), and contains the latest improvements. Capable of being easily lifted by a man, it will pump 800 gallons 200 ft. high per hour, with 40 lbs. of steam. They are made of a capacity up to 40,000 lbs. per hour.

Gas engines form a special feature of this year's Exhibition, and several are shown in work. Among these it will be found that the Messrs. Tangye have the largest and most novel—a 2½ horse on Robson's patent. The distinguishing feature here is that the explosive propelling power is developed and applied at each revolution of the engine when doing ordinary work, and not at each alternate revolution. The front cylinder end is closed like an ordinary steam engine cylinder, and is utilised as a charging pump to compress the explosive gases in a reservoir. These are then transferred to and exploded at the opposite end of the cylinder. The engine is compactly balanced in the mechanical and moving part. The decision of the judges on this exhibit was the award of a first silver medal.

Messrs. Crossley, Manchester, show a half-horse gas engine of their well known and highly appreciated "Otto" type, specially adapted to electric lighting—the dynamo machine being steadily fixed upon the same bed. This worked admirably, lighting up a handsome stand of Swan lamps. To this arrangement a second silver medal was awarded.

The "Bischoff" engine had a medal last year, but there is a new candidate for favour in the users of small power—the cheap, handy, and compact Wither's gas engine (vertical) exhibited by Messrs. Stark, of Torquay. This had a first bronze medal.

Capt. Teague, jun., Pool, next to Messrs. Tangye, is the largest exhibitor, and a capital display he has made, alike in mining models of various kinds, and in his own recent inventions, among which his various forms of ventilating apparatus are conspicuous. His apparatus for clearing the water from levels, &c., needs no description now; but it is shown with the latest improvements as used at Tincroft. The size of the inlet holes for the blast has been reduced, and the number of holes in the large pipe to carry off the products of combustion are in the outcast increased—both points tending to greater efficiency. This was specially noted by the judges, who also warmly commended his new inlet valve for air compressors. It is really a slide valve instead of a lifting valve, and gives the fullest effect to the passage of air. His model of a crooked skip road is amazingly workable and suggestive, and shows how the genius of the Cornish miner will overcome almost any mechanical difficulties. The judges felt that the only way to meet the merits of Capt. Teague's display was to treat it as a whole and award a first silver medal.

To Mr. Frank Taylor, of the Sandycroft Foundry and Engineworks Company, the Exhibition is indebted for a beautifully made model of the most perfect form of the revolving Californian or gravitation stamps, especially adapted for treating gold ores, and capable of the most precise and delicate work. The revolution is produced by the use of long curved cams, working against the collars of the stamps rods. Curved cams are no novelty in Cornwall, but these are of exceptional length and accuracy of outline, and make the stamps revolve with an almost mathematical exactitude. There is an automatic feed arrangement, and the shoes and dies are made of specially hardened forged steel. In fact every improvement has been introduced that the experience of 40 years can suggest, and for the treatment of the highest class and most valuable ores their certainty, and even delicacy of operation (though they are strength itself in material and arrangement) make them unequalled. The grates also strike us as very good.

Capt. Bishop, of East Pool, shows a working model of his improved skip, which illustrates how by a very simple device the haulage capacity of an ordinary skiproad may be increased without any altera-

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tion in the road itself. East Pool has only one perpendicular shaft through which the whole of the stuff has to be drawn. The shaft is 12½ ft. by 6½ ft., and contains the pitwork, the ladder road, and a double skiproad, while preparations are now being made to put in a man engine rod. Space, therefore, is all important. With the ordinary skip, which works between the runners, it was found impossible to draw the increasing quantity of stuff, and any attempt to widen the shaft was almost quite out of the question. The end was then gained by the simple expedient of widening the skip above the runners, and increasing its length in proportion. The difference in drawing power attained by this most simple plan, without any alteration of the road, is 79 tons in 24 hours (186 tons against 107), 150 trips being made, and the new skip carrying 26 cwts. against 15. This new skip overlaps the runners by about 5 in. on either side. Capt. Bishop holds that this form of skip may be used to great advantage in underlie shafts if wider runners could be fixed. Then if the wheels broke by any chance the skip would come up without damage to the road. A second bronze medal was awarded for the ingenuity displayed.

Captain White, of West Peevor, illustrates by working model the method adopted in that mine for hauling the stuff and sending it to the floors with the utmost economy of manual labour. He has adapted in a thoroughly practical manner the cage-drawing system of the colliery districts, and runs the wagons directly away to a "pass," where they are tipped over a grate—what falls through goes direct to the stamps, what runs over goes on the spalling floor. The judges were highly gratified to see this proof of the manner in which the practice of other mining districts might be introduced into the county, and gave a first bronze medal.

Messrs. Henderson and Son, of Truro, show a miners' dial, the principle of which is quite novel. It consists in the attachment to the instrument of two sets of sights, so that the least deviation by accident from the sight of the back object can be at once detected and rectified. When a traverse has to be made in underground surveying over a great length of iron rails the smallest variance from the line of sight, if unobserved, as it may easily be, will of course affect the whole of the subsequent survey—hence the special value of the new arrangement. Three stands are necessary when using the Henderson dial, the instrument being shifted from one to the other as required. The principle is of course equally applicable to surface surveying, though the risk of error there is not so great, and excellent results have been attained by its use. First silver medal awarded for new arrangement.

Another dial shown by Mr. Letcher, St. Day, was described by Capt. Josiah Thomas as the steadiest he has ever worked with. The special feature here consists of the combination of the quadrant with the case in such a manner as to leave the whole face of the dial free. The advantage of this is apparent, and to this also a first bronze medal was given.

Mr. E. F. Newton, Camborne, with other excellent apparatus, has a pumping machine indicator, and this likewise has a first bronze.

Mr. J. Tangye, Redruth, obtained a second bronze medal for a method of giving sliding motion to the shafting. All mill shafting is liable to gall in its bearings, especially near main pulleys, causing them to be too heavily loaded for lubrication to obviate. To prevent this Mr. Tangye's shafting slides gives the rotating shaft a slightly endwise motion, and it is claimed that it will work quite as well with cast-iron steps or bearings as with gun or other metal. The sliding need not exceed ½ in. and is adjustible.

There is a very fine show of articles of almost every kind in Attwood's patent steel, shown by the Stanners Close Steelworks. The merits of this material have been well approved on our mines, and a second silver medal was given.

A capital sample is shown of the Gundy patent cotton belting, which has a first bronze medal.

An exhibit of wire rope by Messrs. Newall, London, had not arrived when the judges made their rounds. A case shown by Messrs. Stephens, of Falmouth, was recently medalled and was not in competition, but a new sample of steel wire rope by this firm of astonishing flexibility had deservedly a first bronze medal.

Mr. T. Clarke, Truro, sends a simple apparatus for testing road metal, which he calls a "Metallometer." The number of blows from a stamp head necessary to reduce the stuff to pass through a grate are counted, and this supplies the information required. Second bronze medal.

Mr. W. Brenton, Pilbathick, exhibits his safety belts, which have already taken Society's honours.

To Mr. White's "Shrewsbury" locks, a capital device universally applicable, in which a balance weight does away with springs, a first bronze medal was given, and the arrangement highly commended.

The Nautilus grate of Mr. Petter, Yeovil, is made with a hood in the shape of a nautilus shell. It closely resembles the appearance of an ordinary dog grate, but the hood conducts the products of combustion right and left in a flue formed behind each of the splayed sides of the fire place. The ashes are retained in the grate, which is really a compact and elegant fire basket, and which is moveable at pleasure. First bronze medal.

Mr. S. Terrell had a first bronze medal for a portable coil for warming rooms, and a second for improvements in roasting apparatus.

Messrs. Ragosime and Co., Moscow and London, sent samples of their mineral steam cylinder and valve oil, which was recommended for trial.

Samples were shown by Mr. Faija, London, of his process for accelerating the hardening or induration of concrete. The concrete is first submitted to a moist heat or about 100°, and subsequently immersed in a siliceous preparation of about the same temperature. A block prepared only three days tested up to 540 lbs. per square inch. The bath is of silicate of soda, 1 part to 12, or 15 of water. First bronze medal.

A very clever and effective plan for an automatic brake on railways—the Parker-Smith—is exhibited in operation by Mr. Smith, Plymouth, and met with such hearty approval that it had a second silver medal. The model is beautifully turned out of hand.

Mr. F. Sara, Plymouth, had a first bronze medal for his new form of syphon, which is always in working order, and especially adapted for the use of spirit and wine merchants.

Messrs. Davey, Sleep, and Co., Crafthole, show models of their improved ploughs, rakes, &c., which have won agricultural honours in many a well fought field, and they now receive a first bronze medal.

Messrs. Galwey, Bainbridge, and Co. forward Meanock's patent lubricator, an effective arrangement by which oil is pumped to the bearings by a little apparatus worked by a tappet from the machine to which it is applied. The judges thought it likely to be of considerable utility for many purposes. Second bronze medal.

Messrs. Wright and Stevens, Plymouth, show a new patent balance valve and water waste preventer. The valve is fixed under water, and is not liable to be affected by frost, though it is closed by the operation of a float. There are no spills or up leathers. The water waste preventer is worked on the syphon principle—one tube within another, and cannot be choked in the too common fashion by scraps of floating refuse. Both inlets and outlets are at the bottom. Second bronze medal.

Mr. White has second bronze medals for his Shrewsbury water-closet and patent knapsack; and Messrs. Wheeler and Wilson a first bronze for their new sewing machine.

Two kinds of fire bars are among the exhibits—Clarke's patent reticulated and perforated furnace bars, which have been brought into use in various parts of the country, and which have received numerous testimonials for their economy and efficiency; and Ferris's diagonal rocking fire bars. The latter the judges considered well adapted to free burning coal, but not to the coal in common use in the county

Martin's improved pistons, in which a double chamber valve is introduced in the body of the piston, and which have heretofore been duly recognised by the Society, are among the general exhibits; and so are examples of Stidder's patent removable stuffing box, for packing the glands of sluice and other valve spindles. By their use access to the gland and the removal of the old packing may be accomplished in the space of half an hour.

Messrs. Ransome and Co., London, amongst other contributions, send their Rainbow steam, water, and liquor raiser, which has no moving parts, and acts upon the vacuum principle.

Nothing has this week been done by the judges with regard to the rock-drills, compressors, and kindred apparatus, of which there is an unusually large display. Upon these judgment is reserved until the trials, which take place on Wednesday next, and which are intended to be upon a scale of completeness hitherto unsurpassed in the county. A special point dealt with then will be the relative economy of the various drills in regard to the consumption of air. Hitherto, local trials have almost invariably been by steam. Now it will be sought to approximate, as far as possible, to the conditions of actual operation. There has also been a postponement of decisions in regard to a few other matters, including the rag frames, of which a model is shown by Mr. J. Hendra.

The drills represented include—McCulloch and Holman's, shown by Messrs. Holman (who have also, by the way, an improved example of their capital double cylinder winch for steam or air); the Barrow, by Messrs. Loam and Sons; the Eclipse, by Messrs. Hathorn and Co.; Stephens's, by Mr. R. Stephens; and the Excelsior, by Mr. Wymer. Of these Stephens's is a new local form, devised as the result of experience of various machines, but with its most distinctive features in the "cradle." The Excelsior is practically new to the county, but has been working some time at Minera and Snailbeach. Like the Darlington, the piston is the only moving part, but greater economy of air is claimed by a "cut off" at half stroke. The "cradle" is very simple, of malleable iron, and is carried by a bar.

Two air compressors are in the field—Messrs. Hathorn's Reliance, the one exhibited having been sold to the Perran Mines, and Sturgeon's trunk air compressor, shown by Messrs. Galwey, Bainbridge, and Co. Messrs. Hathorn also exhibit their patent hydraulic column for use in levels. Messrs. Hathorn have just completed their new tunnel car for holding rock-drills when at work in levels, and it is hoped that it will reach the Exhibition in time for trial. It is very light, easily worked, and compact. The principle of the hydraulic column has been adopted and extended to the arms as well as the upright, and any number of drills, from one up to five, may be worked with the greatest ease.

Samples of colours made from china-clay, which, however, made a late arrival, are shown by the Alumina Paint and Colour Company. The tints are useful and the quality good.

Other late arrivals include the admirable series of samples of Messrs. Newall's wire rope, and a full series of the Britannia Company's excellent and economical lathes.

The proceedings at the opening ceremony were of a singularly successful character, and were participated in by a large number of notables. Miss Anna Maria Fox, the founder of the Society, was there, and had her health proposed at the luncheon held in honour of the distinguished visitors, by Mr. Richard Taylor, F.G.S., who was himself the secretary of the first Exhibition, and has never since ceased to be officially connected with the Society, for 37 years as secretary, then as president, and since as vice-president. Amongst the visitors and others from a distance were—Sir J. St. Aubyn, M.P., Mr. A. Pendarves Vivian, M.P., Mr. St. Aubyn, M.P., Mr. Ross, M.P., Prof. Couch Adams, F.G.S. (the discoverer of Neptune), Prof. Grylls Adams, F.R.S., Mr. Warington Smyth, F.R.S., Dr. Jago, F.R.S., Sir Vyell Vyvyan, Mr. Whipple, F.M.S., Dr. Barham, Mr. Pendarves, Col. Tremayne, Mr. Bickford Smith, Mr. Molesworth St. Aubyn, Mr. F. S. Bolitho, Mr. W. Husband, Mr. Peter Watson, Mr. Frank Michell, Capt. Josiah Thomas, Capt. Teague, J. Henderson, C. Twite, F. G. Enys, Mr. J. Pool, Capt. Hosking, Mr. Eustice, Mr. Beauchamp, Mr. Frecheville, F.G.S., Mr. Worth, F.G.S., Mr. Bain, Mr. Allbright, Mr. E. Vivian, &c.

In commemoration of the Jubilee the following gentlemen were elected honorary members: Prof. Grylls Adams, F.R.S., Messrs. C. W. Peach, A.L.S., W. Pengelly, F.R.S., F.G.S., W. H. Preece, F.R.S., R. H. Scott, F.R.S., J. W. Swan, F.G.S., and C. W. Siemens, D.C.L., LL.D., F.R.S.; whilst first silver medals were awarded for their great services to the Society to Capt. Liddell, R.N., Mr. Casella, F.R.A.S., and Mr. Whipple, F.R.A.S.

In the course of his address the President (the Rev. Canon ROGERS) made the following apt remarks on the progress made in the Polytechnic lifetime in mechanics, and particularly in mining. He said:—The most important Cornish industry was that of mining, and it might be interesting to take a rapid survey of the way in which endeavours had been made to improve in the various branches into which it ramified. Mr. J. Taylor said in 1837 "that a dial was not to be got in Cornwall a few years ago, nor could the slightest repairs be effected there." Phillips obtained a first silver medal in 1839 (the Polytechnic's seventh year) for an underground dial, and since then the names of Wilton and Newton had become well known as superior makers and constant improvers of instruments. Mr. Fox's deflector had been made at Perran Wharf, and Mr. Wilton had made the same instrument for the Admiralty. Heath, the leading optician of Plymouth, and recently Cadwell, of Camborne, and Letcher (the designer of the theodolite) were among the number of their exhibitors. Valuable cross-sections of mines, or mine districts, had been given at Botallack, Clifford Amalgamated, East Pool, Dolcoath, Carn Brea, by Capts. Maynard, Gray, and others. The mode of estimating the work done by steam pumping engines by the number of pounds lifted a foot high by a bushel of coal was introduced by Watt, who claimed one-third of the value of the coal saved by his engines as compared with that consumed by the old atmospheric engine, which was computed to lift 7,087,800 lbs. Watt's patent expired in 1800, and it was not until about 1812 that Mr. Lean commenced the publication of his duties tables. Fifty years ago, when the Polytechnic was instituted, several engines performed a duty equivalent to 70,000,000 lbs. It was to be feared that the improvement of the pumping-engine had hardly developed since in keeping with the age. It was, however, one of the leading objects of the Polytechnic to encourage to the utmost the improvement of the engine. Improvements of greater or less value in valves, packing, pumps, buckets and clacks, fire-bars, had been exhibited, some from the well-known foundries at Hayle, Perran, St. Blazey; some by the Messrs. Tangye, who on a recent occasion so handsomely acknowledged the stimulus afforded to them by the Polytechnic's award. After referring to the adoption of hydraulic power, the introduction of air-compressors, the improvements in winding machinery, the freedom from accidents which has resulted from the use of wire-rope, first exhibited in the Polytechnic-hall by Mr. Stephens in 1860; the introduction of ascending machinery for the miner, which was in a great measure due to the Polytechnic; the President said another important branch of mining machinery, the development of which (if they might judge from the large number of different kinds exhibited) the Polytechnic had helped forward was that of boring machines. The first exhibited in the Polytechnic was in 1864, and since then various kinds had been successfully used in the Cornish mines, and their value, under certain conditions, was now generally acknowledged. The subject of explosives occupied the attention of the Polytechnic as early as 1834. Firing by the magnetic spark was exhibited in 1861. The first experiments by any society on guncutton and nitro-glycerine were made at the Polytechnic in 1865. Ventilation and lighting of mines were also matters of vivid interest to the first members of that society. Valuable papers on the length of life, the diseases, and the fatal accidents of Cornish miners, by Moyle, Lanyon, Couch, Blee, and Quick were to be found in their reports. There were in this year's Exhibition models of Capt. W. Teague, jun's., recent inventions. Several crushers and pulverisers have been exhibited at the Polytechnic, but little advance appears to have been made in copper crushers, partly owing, perhaps, to the far smaller yield of copper ore since the Clifford Amalgamated had ceased. The waste in dressing tin was formerly so great that Mr. Basset is said to have been rated in more than 4000*l.* for his dues on the debris brought down by the Red River alone. Though there may be room still for some improvement in dressing by a more careful sizing of the small particles of the tinstuff, it may be hoped that the waste has been considerably diminished by the improvements of the last 50 years. The gratitude of the miners of Tresavean for the part the Polytechnic had taken in introducing the man-engine was evidenced by an address signed by 391 of them in 1843, and the appreciation of the benefit conferred on mining interests generally was shown by subscriptions amounting in 1850 to 51*l.* 10s. from 16 mines.

AIR-TESTING FOR MINERS.

Dr. C. Le Neve Foster forwarded to the Polytechnic Exhibition a simple apparatus for the use of miners, made by Mr. J. T. Letcher from his suggestions—an adaptation to mining purposes of Dr. Angus Smith's method of air-testing. In his accompanying paper Dr. Foster remarked that the necessity of providing a proper supply of pure air to all places in which men were living or working was thoroughly recognised. It was requisite, however, to have some means of testing the purity of air, so that in the first place the air of any confined space could be compared with the external atmosphere, and decision made whether or not the impurities attained proportions injurious to health; and, secondly, to ascertain by exact experiments what amount of improvement was effected by the use of any ventilating apparatus. The test relied on by miners was the manner in which a candle burnt. They considered that if it burnt freely when held upright, and did not go out if moved quickly from side to side, the ventilation must be good. Dr. Angus Smith had shown however, that this was a fallacy, and that the candle gave no distinct sign of the air being bad until the impurities had reached a point far beyond the maximum consistent with good ventilation. Some other test, therefore, was necessary, and Dr. Foster proposed an adaptation of Dr. Angus Smith's process, little known to miners though referred to in the report to Lord Kinnaird's commission. The plan consists in observing the precipitate produced in baryta water by carbonic acid gas of the air under examination. First of all the degree of milkiness is noted produced by passing a given volume of pure air through the baryta water, and then it is determined experimentally how much of the air of the mine or room is required to produce a precipitate of equal opacity. The apparatus consists of the following parts:—A wide-mouthed bottle holding about 2 ozs., into the cork of which are fitted two glass tubes, one of which simply passes through the cork, the other down to the bottom; a piece of india-rubber tube 6 to 8 in. long; a T-shaped tube provided with two valves; and a flexible india-rubber ball holding 1 or 2 ozs. The T-piece is fitted to the ball and connected by the tube to the bottle, the valves being so arranged that squeezing the ball forces the contained air into the bottle, and removing the pressure fills the ball from the air in which the apparatus is placed. After giving the ball a few squeezes, so as to fill the bottle with the air to be tested, ½ oz. of baryta water is poured in and the cork replaced. The bottle is then well shaken, more air squeezed in, and the operation repeated until the water becomes slightly milky. The number of fillings is noted, and the air in the bottle reckoned as one to two, according to the size of the ball. The standard proposed by Dr. Foster is that amount of opacity which prevents a pencil mark on paper being seen through the solution. If 40 strokes of a 1-oz. ball in open air containing ·04 per cent. of carbonic anhydride produces this effect the air of a mine would contain ·16 per cent. if only 10 strokes were necessary, ·32 per cent. if only 5. The box arranged is not larger than an opera-glass, but contains the apparatus and the means for six tests in ½ oz. phials of baryta water. The bottle should be washed out with distilled water. Any mine agent could easily use it, and Dr. Foster believes that its adoption would result in the end so as to ventilate ends, winzes, and rises far more effectually than at present.

THE MINERS' ASSOCIATION.

The annual meeting of the Miners' Association of Cornwall and Devon was held at 12 o'clock on Thursday. Mr. Richard Taylor, F.G.S., presiding. There was a very large attendance, including Sir J. St. Aubyn, M.P., Mr. A. P. Vivian, M.P., the Rev. Canon Rogers, Dr. Hudson, Messrs. Wm. Grylls, D. W. Bain, C. Twite, W. Husband, J. Henderson, T. Pryor, G. Taylor, F. Taylor, Rev. W. Rogers, Josiah Thomas, W. Argall, H. Tilly, J. Lean, J. Treglohan, J. J. Beringer, Charles Thomas, W. Teague, Gilbert J. Hosking, W. Holman, H. P. Vivian, John Hitchens, Matthew Loam, John Gill, A. K. Barnett, W. N. Carne, R. N. Worth, &c. Letters of apology were read from the President, Mr. W. C. Borlase, M.P., Mr. Robert Hunt, F.R.S., the founder, Dr. Foster, and others.

The following reports were read:—

The council reported the loss by death during the past year of Lord Robartes and Sir P. P. Smith. Both gentlemen were liberal and consistent supporters of the Miners' Association since its founder, Mr. Robert Hunt, F.R.S., first put in practical form his scheme for bringing elementary science within reach of Cornish miners. The subject of mineralogy had again made its appearance in the class list, and the action of the council in this matter had not been without influence on the South Kensington authorities, as the paper set at the last examination was one which fairly came within the range of a Cornish miner's study. It was to be hoped that papers of that character would be maintained, as they could not ask their pupils to devote the small period of time at their disposal to the pursuit of mathematical problems quite foreign to their daily work. They had been indebted for the third time to the City and Guilds of London Institute for their liberal donations of 100 guineas to assist them in their work. They regretted that blow-pipe analysis had been removed from the list of subjects entitling teachers to earn grants or the passes obtained at the examinations. The suggestion of Dr. Le Neve Foster had been carried out, and their lecturer had been instructed to take lessons on mine surveying underground from a competent teacher. Mr. Beringer had devoted himself to this study during the summer months, under the guidance of Capt. Henderson, of Truro, and classes would be formed during the coming session for preparing pupils for the next examinations. It would be for their council to memorialise the Institute to include essaying in their list of technical subjects, and to ask them to continue the grant so kindly made three years ago. With the aid of that grant they had encouraged their teachers to rely less exclusively on purely scientific subjects; they had founded local scholarships of 10*l.* each at the Camborne laboratory, and in that way enabled the holders to devote several hours a day to practical work; they had subsidised exhibitors at the Royal School of Mines, and in each case the exhibitioners had received a valuable appointment abroad immediately after completing his course of study; and that grant had also enabled them to equip the laboratory at Camborne with efficient apparatus, and supply the students with chemicals at a cheap rate. The council noted with pleasure that new buildings were being promoted both at Redruth and Camborne for the purpose of science teaching. Canon Rogers had been appointed a trustee of the Redruth School; and Mr. Basset had expressed his desire to hand over the laboratory at Camborne, so as to be under similar management. The council desired to place on record their sense of the great boon Mr. Basset had conferred on the young men of Camborne and Redruth by the erection of this building. Mr. W. C. Borlase's term of office as President having expired, the council recommended the Rev. St. Aubyn H. M. St. Aubyn, of Clowance, be elected to the vacant chair, and that Mr. Borlase and Dr. Le Neve Foster, be added to the list of vice-presidents; and that Messrs. Collins and Kitto be elected members of the council.

The following is a list of awards:—In organic chemistry, *Mining Journal* prize, H. Anstey, Camborne; council prize, E. Opie, Camborne; practical chemistry, Cornish Telegraph prize, R. E. Hall, Camborne; council prize, W. M. Burn, Helston; principles of mining, *Mining Journal* prize, G. W. Teal, Pendeen; applied Mechanics, Western Daily Mercury prize, R. E. Gavier, Keyham; council prize, R. Phillips, Keyham; theoretical mechanics, Mining World prize, C. Lillicrap, Keyham; steam, *Mining Journal* prize, R. Phillips, Keyham; council prize, S. J. Venning, Keyham; machine construction, West Briton prize, W. Cock, Camborne; council prize, G. H. Martin, Hayle; mathematics, Cornwall Gazette prize, C. Lillicrap, Keyham; council prize, T. Avery, Keyham; acoustics, light, and heat, secretary's prize, A. W. C. Claxton, Keyham; council prize, J. E. Martyn, Camborne; magnetism and electricity, Mr. Treglohan's prize, J. C. Marks, Keyham; council prize, J. W. Millard, Keyham; building construction, Mr. Warren's prize, W. Metcalf, Keyham; council prize, C. Tuckey, Keyham. The prizes for mineralogy, geology, and metallurgy have not been awarded, and the following students have taken positions entitling them to prizes, but are disqualified by having taken the same prize in a previous year:—G. A. Haggarty, Keyham; and E. Opie and J. Eustice, of the Camborne class.

The lecturer, Mr. BERINGER, read his report in which he stated that it would be seen from the published list of successes, that the number of passes at last May's examinations were not less than that

of the last few years. In spite of this, however, the work in the classes had been carried on in a very satisfactory manner. It must be remembered that the pay of the teachers was not sufficiently remunerative, and with this and the strict character of the examinations, it was no wonder that some of the classes had become dormant. The remaining classes had a lively and healthy existence. Magnetism and electricity were the most popular study, due in part to the encouragement of South Kensington, but more to the growing importance of the subject, an acquaintance with electricity would soon be demanded of every intelligent individual. Mineralogy was still among the unpopular subjects, but he did not think it would remain so. The work done by the students who are learning practical chemistry and assaying in the Camborne laboratory was a very satisfactory feature. These students had worked continuously for periods varying from a fortnight to three months, and had fully demonstrated the superiority of this work of instruction.

On the motion of Mr. W. Husband and the Rev. Canon Rogers the reports were received and adopted. Canon Rogers recommended that in addition to the test-books, students should read the original papers by great scientific investigators. The council thought that assaying was best taught by working continously for several hours.

The PRESIDENT said that fortunately in Cornwall ventilation was very satisfactory as a rule. He, however, had to do with mines when the water was more charged with carbonic acid gas than ordinary soda water, and they had to provide more capacious means for its removal than even for the water—powerful pans and pipes running up to 15 and even 16 in. in diameter. This system had been perfectly successful. The carbonic acid readily separated from the air and formed a body of gas in the bottom of the level, to walk through which felt as if walking through warm water. It could be dipped up in cups and joined on candles to extinguish them as if water. He hailed with great pleasure the plan of Dr. Foster, and most undoubtedly should avail himself of it.

Capt. JOSIAH THOMAS supposed that the air was pumped up and poured out like water.

The PRESIDENT replied in the affirmative. It was absolutely colourless and invisible.

ON THE DETERMINATION OF THE PERCENTAGE OF NITRE IN GUNPOWDER.

Mr. BERINGER in this paper stated: Gunpowder is a variable mixture of nitre (65—75 per cent.), charcoal (12—15 per cent.), and sulphur (10—20 per cent.) It varies considerably in quality, partly because of difference in composition, and partly because of the varying care bestowed on it in manufacture. There exists with some manufacturers a desire to determine the quality of the powder they use by a chemical analysis; but this desire is too frequently suppressed because of the cost attending the employment of a skilled analyst. I have been induced to publish the following process because by it the percentage of nitre may be easily determined with sufficient accuracy by one who has not had much chemical training. This, and the fact that an assay requires but little more than an hour for its completion, may render it useful in the case indicated. Mixed with some inert material such as barytes, a sample of powder may be heated sufficiently to drive off the sulphur without fear of ignition, and if the desulphurised powder be further heated the charcoal will be quickly burnt up, without causing loss, deflagration, or explosion. With the sulphur and all but the ash of the charcoal removed, nothing of the powder remains except some potash salts derived from the nitre. By the addition of sulphuric acid and subsequent ignition, these salts are converted into potassic sulphate, and from the weight of this the percentage of nitre can easily be calculated. Mr. Beringer added laboratory instructions for this simple and effectual process.

Mr. TWITE thought all would appreciate this paper, inasmuch as it showed in what an easy and practical way the work of scientific men might be placed. By getting the elementary knowledge of science in their classes, and by the aid of such excellent instructors as Mr. Beringer, they would be far better qualified for any position in life.

Mr. BARNETT spoke of the high value of that process, and asked at what temperature the ignition took place.

Dr. HUDSON also spoke highly of the process, and Mr. Beringer's ingenuity was warmly praised by others.

One of the most interesting features of the meeting was the exhibition of a series of examples of "lode" and "country" from several mines, including Dolcoath, Wheal Unv, West Peevor, South Penstruthal, Wheal Eliza, and some of the St. Just mines. Capt. Josiah Thomas made use of the Dolcoath specimens to illustrate in a thoroughly practical manner the varying characteristics of that famous mine. A large transverse section of the main lode and the lodes in connection therewith was laid upon the table, and the different illustrative specimens laid thereon at the points they occupy in nature from the adit level down to the sinking in the bottom of the engine-shaft, a sample of the lode being shown at the point just 400 fms. from the surface. Capt. Thomas pointed out that this was by far the deepest point reached in any Cornish mine, and explained that the experience of Dolcoath was contradictory of the hypothesis with regard to lodes which had at one time been widely if not universally held. It had been thought by scientific men and miners that lodes died out in depth, but their lode at Dolcoath widened out the deeper they went. Then again, instead of the granite getting harder as they increased in depth and got away from the killas, the granite in the bottom of the mine was the softest rock they had. He recommended continuous working in depth, and the utmost economy, being certain that the riches of Cornwall were in no way exhausted.

Votes of thanks to the President concluded the proceeding.

SOUTH STAFFORDSHIRE AND EAST WORCESTERSHIRE INSTITUTE OF MINING ENGINEERS.—The usual monthly meeting of members was held on Tuesday at the Mining Museum, Dudley, Mr. W. Farnworth presiding. There were also present, among others, Messrs. W. North, H. Johnson, W. J. Hayward, H. B. Marten, John Hughes, Thornton, Pasfield, H. Johnson, jun., Fellows, Sopwith, Marsh, Waring, Hughes, and Alexander Smith, M.I.C.E., secretary. A vote of thanks was passed to Mr. J. P. Baker, H. M. Inspector, for a copy of his official report. The President explained that the Council of the Institute had been over that day to Cannock Chase, and witnessed some experiments with the new lime process of getting coal. Mr. Sopwith, of the Cannock Chase Colliery, said the men in the employ of the patentee had been down the pit, and had had offered to them the shallow seam to experiment upon. They chose a fair specimen, and without going into details he might say that after the lime cartridges had been put in, and the expansion had taken place, some 40 or 45 tons had come down in a solid block. So far as he was able to say that evening the trials had been as successful as they could desire. The cost of drilling, &c., would have to be carefully worked out in reference to gunpowder; but it was well that he should say there was no need for them to insist on the use of lime in their colliery, because they could use naked candles. The coal came down so quietly that the only slack to be made would be that in breaking up the coal for the tubs. Mr. Sopwith then gave some figures, and concluded by expressing a very favourable opinion of the lime process, as introduced by Messrs. Sebastian Smith and Co. Mr. Alexander Smith then described the process of drilling, charging, and watering the lime. A long discussion followed the descriptions given by Mr. Sopwith and Mr. Smith, and it transpired incidentally that the process was to be tried in the hard coal of Sandwell, when the extended trials at the Chase are concluded. A hearty vote of thanks was passed to Mr. Sopwith for the opportunities he had given the Institute.

HOLLOWAY'S PILLS.—These pills are more efficacious in strengthening a debilitated constitution than any other medicine in the world. Persons of nervous habit of body, and all who are suffering from weak digestive organs, or whose health has become decayed by bilious affection, disordered stomach, or liver complaints, should lose no time in giving these admirable pills a fair trial. Coughs, colds, asthma, or shortness of breath, are also within the range of the sanative powers of this very remarkable medicine. The cures effected by these pills are not superficial or temporary, but complete and permanent. They are as mild as they are efficacious, and may be given with confidence to delicate females and young children.

Original Correspondence.

THE INDIAN GOLD MINING COMPANIES.

SIR,—I have taken much interest not only as a shareholder but as one of the public in the East Indian gold mining industry, and have been in hopes of reading of something encouraging in the reports of the proceedings at the shareholders' meetings, but have not discovered anything. We have heard plenty about the quantity of gold shown by assay, but we have not yet seen or heard from any of the directors or mine managers whether they have been able to extract the gold at a paying rate from the pyrites in which it seems almost entirely to be bound. Mr. Bonwick, in his sanguine and interesting little book on the Resources of Queensland, quotes candidly from Mr. Trollope thus, "All that I have seen in Australia teaches me to believe that every ounce of gold raised has cost more in its raising than the price for which it has been sold" (page 109), and further on (page 112) he says "The Etheridge quartz mines have suffered from the veins having an excess of mundic, a combination of sulphur and iron, holding the gold." Now, that is just what I fear must be the case with the Wynaad companies, else why so long letting us know the real facts? Can they work the ores to advantage, or can they not? Several of the managers—such as Grove, Cooper, Severn, and Pinching, as well as Harvey—who were connected with the early brought out companies must have tried the working of the pyrites thoroughly; why not frankly tell us the result, instead of putting us off with tantalising excuses. Barclay's brewery might have been built and set to work at least twice over since the early companies of the Wynaad gold field were started. I sign myself what I am—

AN ORIGINAL SHAREHOLDER
Of several of the early East Indian Gold Mining Companies.

Sept. 4.

GOLD AND DIAMOND FIELDS OF SOUTH AFRICA.

SIR,—About three weeks ago I sent you a plan of the celebrated Kimberley Mine, which I hope you have received.* It cannot fail to interest all those who are concerned in diamond mining, and as soon as I learn that the Journal has taken it over and your readers have had sufficient time to digest its contents I intend giving a detailed account of each of the companies, beginning with the Beaconsfield at the east end. Intending speculators in the Kimberley Mine will lose nothing by waiting until after I have explained the whole of the plan. I regret to say that the financial position of South Africa generally is getting very bad indeed. The scarcity of coin on the diamond fields means the scarcity of coin in every town and hamlet in the country. The affairs of the majority of the companies in the Dutoitspan and Bultfontein Mines are in a deplorable condition, and how can it be wondered at when the management of some of the most important companies is entrusted to men who are proficient only in the art of bullock driving. It is a common thing to hear the remark "Oh! he is only made manager to keep his mouth shut,"—whatever that may mean.

At Old De Beers Mine, the Baxter's Gully Company, Schwab's Gully Company, Old De Beers Company, and De Beers Central are good concerns, and are earning moderate dividends. But it is sad to witness the manner in which the affairs of such fine companies as the Victoria are handled, and if they ever pay dividends under their present system it will be little short of a miracle. I have heard nothing lately with regard to the formation of a company for the purpose of working St. Augustine's Mine, which is situated about 1600 yards west of the Kimberley Mine. St. Augustine's Mine consists of from 60 to 70 claims of about 30 ft. square, and at a rough estimate is valued at about 240,000*l.* sterling. This seems a long price for an undeveloped mine of such small dimensions, but I must say the prospects are certainly good, and the principal promoter is above suspicion.

European shareholders who are interested in Otto's Kopje may be interested in the following, which I clip from to-day's Diamond News:—"Final Notice.—Notice is hereby given that as two-thirds of the claimholders have not yet paid the 5*l.* call, the directors have decided to suspend operations at the mine. Unless the call is immediately paid steps will be taken to liquidate the concern.—By order, H. Harrington, Secretary."

It is reported here that a company with a capital of 1,000,000*l.* sterling is being formed in Paris for the purpose of working Kamfersdam. I fail to see why they require such a large amount of capital, because 200,000*l.* is enough to purchase the mine, and another 100,000*l.* would be ample to develope it. The Boshoff Coal Prospecting Company have met with one or two small seams of lignite about 1 in. thick, rather under than over. Their prospects are fairly good, but money is so tight that I am expecting every day to hear they have suspended operations.

The lawyers in Kimberley have a rollicking time of it, and I venture to assert there is not another place in the civilised world with an equal population where judicial contests are so freely indulged in. Indeed it is the only means open to some of the gold laden asses of attaining notoriety. There is a case now pending, the Central Company *v.* the Mining Board, under which the Central Company claims from the Mining Board the sum of 100,000*l.* by way of damages, by reason of their claims being flooded during the months of May, June, and July, 1881. Now I maintain this is a just claim, but it is evident that the lawyers are playing into each other's hands, and while one of the litigants are tugging at the head and the other at the tail the lawyers are getting all the cream.

I have on several occasions pointed out that many of the hastily formed companies of last year would have to be wound up, and some of your contemporaries accused me of entertaining pessimist views, but time has proved that I was right. Weekly, companies are suspending operations, and in the Kimberley Mine alone companies representing more than half a million sterling are idle. Such a thing as friendly liquidation appears to be avoided as a pestilence, and both directors and shareholders appear to consider it a part of their policy to expend any little remaining capital in actions at law.

In consequence of the prevalence of small-pox in Cape Town the Contagious and Infectious Disease Act has been proclaimed throughout the whole colony. Illicit diamond buying appears to be as rampant as ever, but it is next to impossible to catch the wealthy I.D.B.

Mr. Charles Drury, who is, in all probability, the most powerful writer in South Africa, after referring to the poor wretch who gets hold a diamond for the purpose of preventing actual starvation, then refers to the wealthy scoundrel as follows:—"The other picture is that of the successful scoundrel, who has ample to support himself in luxury, but whose apology for a heart is so filled with avarice that he encourages others to play the game at which he will not risk his own worthless hide. They may have to serve their five years, they may be branded for life as convicts for the gems out of which he has realised polluted gold by their passing through his hands before they were shipped, they must be punished (and it is right they should be), they must build the breakwater—what does he care? The breakwater will shield his vessel should he happen to start upon his next European trip on a stormy day."

The news from Mankoroane's country is as unsatisfactory as it has been at any time since the Boers first commenced the slaughter of blacks on our northern border.

The canteen keepers gold rush in the Transvaal is just like some of the old diggings—a few patches of nice looking gold, but the majority of the diggers are not earning their salt. There is no doubt that the best gold property in the Transvaal is held by Messrs. Hampson and White under the old gold laws. A person, named Owen, has obtained a concession from the Boers for this property, provided he compensates Messrs. Hampson and White for their prior rights. In a letter I received from England the other day it was stated that Owen had bought out Hampson, White, and Co., and was forming a company himself for working it. I at once waited on Hampson to enquire into the matter, and he informed me that there was no truth in the statement, and that no correspondence had taken place on the matter. I have some rather interesting details with regard to some of the alleged gold mines in the Transvaal, which, for reasons of my own, I withhold for the present. It is generally considered that when persons have *bona fide* mines to offer to the public they do all in their power to court enquiry, and the greater the publicity given to the matter, whether it be through your correspondent or otherwise, the better pleased are all honest promoters of companies.

Sir, I have learned during the past week that there is a conspiracy between a few adventurers in the Transvaal and this place for the purpose of suppressing the information supplied *pro bono publico* in my weekly letters to your valuable Journal. Further comment unnecessary, but I challenge any person in this country to point to a property that I have condemned that is worth a *sou*. I shall refer to this matter on a future occasion.

The balance-sheet of the British Company (Kimberley) must be considered highly satisfactory. Ten per cent. for the quarter is very good. I led your readers to expect a larger dividend, and was it not for the great fall in the price of diamonds my anticipations would have been more than realised. I have not time to send you particulars of the other Kimberley mine companies by this mail.

Kimberley, Aug. 10. CORRESPONDENT.

* The plan of the mine referred to as received, when it reached us was published in the Supplement to last week's *Mining Journal*.

GOLD AND MINING FIELDS OF SOUTH AFRICA.

SIR,—For some months past we have noticed that your Kimberley Correspondent has been paying some attention to the Jagersfontein Mine in the weekly letter which he is in the habit of sending to your valuable Journal. Latterly his statements regarding matters affecing the interests of shareholders in the Jagersfontein Mine have been so utterly beside the truth, that, after mature deliberation, we have considered it advisable to address you on the subject, and to point out that your Correspondent must be either hopelessly ignorant of the state of affairs at Jagersfontein, or else that he is misrepresenting our present position and future prospects to serve some discreditable purpose.

In his letters which appeared in the Journal dated 3rd and 10th, he endeavours to lead your readers to believe that the Jagersfontein companies have practically ceased to work. He says they are doing no good now. As a matter of fact, at the time (about the middle of May last) when those letters were written, all the Jagersfontein companies—with the exception of the north-east company which has been embarrassed by litigation since its formation—were in full work, and most of them have continued working steadily up to date.

It is true that none of the Jagersfontein companies have yet declared a dividend; but this is due to the fact that all the companies commenced with an adequate amount of working capital, and, besides this, most of them underestimated the quantity of floating reef they would have to put out before they were able to work diamondiferous soil exclusively.

We only ask for fair play at your hands; and, in order to show you that your Correspondent is wrong in the statements recently forwarded to the Journal, and that Jagersfontein Mine is being steadily and vigourously worked, we enclose the quarterly or half-yearly reports and balance-sheets of such companies as have already held their meetings. From these documents you will see that during the last six months work in the mine has never flagged, and you will also be able to arrive at an estimate of the value of the various companies' claims, and of the machinery and gear erected and working there.

In his last letter your Correspondent states that discoveries of coal in the Orange Free State have had such an effect on the price of fire-wood that wood fuel has fallen 25 per cent. This is untrue; fire-wood has been steadily rising in price during the last six months, the quantity of coal brought into Jagersfontein being so infinitessimally small that it has not effected the price of fire-wood in any way, nor in our opinion would it have done so if the amount of coal available had been three times what it actually was. On looking over your Kimberley Correspondent's letter of May 5 last, we observe that he asserts that seven claims in Jagersfontein were recently put up to auction, and that the highest bid obtainable was 51*l.* a piece. As a matter of fact 65*l.* were offered, but this is not important. The truth is that of these seven claims five and a half were in the reef, that is to say, outside the mine; and, therefore, were not worth 50 pence for diamond mining purposes. The claims were abandoned as worthless by one of the Jagersfontein companies, and your Correspondent's statement that 200*l.* would have been a fair price for them shows how utterly ignorant he is of the value of property in Jagersfontein.

In conclusion, we would draw your attention to the fact that your Kimberley Correspondent constantly avails himself of your columns to advertise undertakings, such as Otto's Kopje, and the so-called St. Augustine's Mine, which are openly spoken of both here and in Kimberley—and, in fact, wherever they are understood—as palpable swindles; it seems to us hardly fair that a man of his stamp should have *carte blanche* to damage the interests of Jagersfontein Mine in the Journal, while he, side by side with his unfounded strictures on Jagersfontein, consistently puffs outside speculations which are admitted to be of more than doubtful character. We are all largely interested in Jagersfontein Mine, and we are quite content to allow the mine to stand or fall by its own merits; but in the interests of shareholders, as well as in our own, we cannot quietly see a promising and *bona fide* enterprise misrepresented to your readers by an anonymous writer who appears to be connected with such questionable undertakings as Otto's Kopje and St. Augustine's Mine. We hope you will examine the annexed reports, and compare them with the reports furnished by your Kimberley Correspondent. To show you how little likely that gentleman is to be intimately acquainted with what is going on in Jagersfontein, we may add that the latter mine is nearly 100 miles from Kimberley, and that your Correspondent who is known to us has not been here for over twelve months. We trust that you will be able to find space for the above in an early issue of your estimable paper.

ROBT. PLEWMAN, Chairman, Standard Diamond Mining Company.
C. REID, Sen., Chairman, President Diamond Mining Company.
C. REID, Sen., Acting Chairman, Palmerston Diamond Mining Company.
W. H. BEDDY, Chairman, Kohinoor, or White Diamond Company.
W. H. BEDDY, Chairman, Fauresmith, Diamond Mining Company.

Jagersfontein, district Fauresmith, Orange Free State, July 27.

HOOVER HILL MINING COMPANY.

SIR,—At the shareholders' meeting of the above company the Chairman has been good enough to vent his ire towards me in no small degree; and in justice to myself will you allow me to make the following reply:—The Chairman enlarged considerably on the fact that at the beginning of the company's operations I made use of the word "quarrying," and not veins or streaks of small matter, conveying by this expression the idea that large quantities of ore were there. No doubt, Sir, I did make use of this word, and to speak of a "dyke" 30 to 40 ft. in width to be "quarried" was right enough if it was to be mined, and from the assays one and all were under that impression. My quotations as to the value of the stone broken from this "dyke" were based upon assays furnished me. First, by those made in London, those made by Mr. Bauerman, and next from many made at the mine. Those made at the mine were done by a person who was in the employ of the mill contractors. I had received from that firm the assurance that he was a competent and practical assayer, and in accepting his voluntary services I had no reason to doubt the accuracy of his returns which in all good faith were reported to the board in the manner stated by the Chairman. What I did was to take upon myself the responsibility of these assays, framing my weekly reports accordingly, believing them to be true.

Now, Sir, pieces broken from this "dyke" in various places and at various times showed gold in the pan, some rich, others poor. Amongst so many apparent proofs of having good ore I had every reason to hope for a fair average in the mill. When the mill did go to work many complications arose, but I did not consider myself at liberty to make any premature statement whereby I should de-

preciate the company's property until complete mill tests had been made. In the midst of these tests I was taken ill, and continued so with but slight intermission until the month of May last, and all the work devolved upon the company's assayer. With reference to that gentleman the Chairman said "he was a man totally unfitted for his duties, he had learnt a little theoretical assaying, &c." Well, Sir, I can only say I took the same precautions the directors did to secure a good man. They applied to the Royal Mining Schools and I applied to the Columbia Mining College of New York, and on this recommendation this gentleman was engaged. The Chairman stated that I was continually away from the mine, and at one time appears not to have been there for seven weeks. Further, that single-handed or in conjunction with my assistant (the assayer) I was keeping a store, and that I had been receiving commissions for articles supplied to the company. I deny, Sir, one and all of these charges. I challenge anyone to prove that I was away seven weeks or seven days from the mine otherwise than by illness. I defy and challenge anyone to prove that I had a store at the mine, or that I had one iota of interest in it directly or indirectly. I positively deny receiving any commission for myself. I characterise these statements as false and malicious, and in saying this I do not wish to impute a bad motive to the Chairman, but rather that he has been misinformed and misled. With regard to this store, the mine being 20 miles away from a place where the men could buy provisions I granted permission to a son of one of the vendors to open one. During my illness so many complaints were made by the men that they could not get proper provisions that I instructed the assistant in charge—the assayer above referred to—to put a man in charge and give it his supervision, and see that the men had no further cause for complaint. I advanced a few hundred dollars of the company's funds to pay for the stock this man had on hand to get rid of him, this sum being refunded from proceeds of these goods sold to the men. So much for the store business. It is plainly visible where such animus comes from. The company's officials or the company are running this store now, I am informed.

Mr. Editor, I am willing to take my share of the blame for having been duped by false assays, but I decline to be made the scapegoat for all. The Chairman's way in trying to explain this salting business is all wrong. I have stated to the board that the samples I brought to England had been in my opinion salted, not the mine, and I offered to give certain proofs. In making use of the expression salted I meant that ore or stone I had taken as average samples of the "dyke" and other places, put into sacks and tied down by me at the mine were removed by someone and replaced by a richer quality, not in transit, but at the mine; and the trick was carried out before I had an opportunity to box them down at this place. Let me here state that in colour or texture of this stone there is nothing to distinguish rich from poor. I am more than ever convinced that chicanery of some kind was played with the first samples, and that during the early part of the company's operations further assays reported to me led me to frame my weekly reports in accordance.

With regard to the Chairman's assertion that my management was an extravagant one I deny it. Allow me, Mr. Editor, to quote the old saying, "once bit, twice shy," and with it I venture to say that to judge or test a Carolinian gold mine with its peculiarities and surroundings I am as well fitted as most experts that can be brought into this field, and notwithstanding the Chairman's opinion to the contrary the best interest of the company would have been served in the end if the proposal to purchase the Brewer Mine had been entertained. I am afraid I shall be trespassing on your valuable space too much, and will, with your permission, refer to this matter again at a later date.—*High Point, Aug.* 22. JOS. REMFRY.

MYSORE REEFS GOLD MINING COMPANY.

SIR,—In continuation of the correspondence between Colonel Blair and myself concerning the affairs and position of this company I have pleasure in forwarding the subjoined, with the request that you will find space for them. JOHN CLARE.

Widnes, Sept. 6.

[Copy of Col. Blair's Reply.]

DEAR SIR,—I am in receipt of your favour of 26th inst., and I have sent you a copy of the Mining World, which contains a full report of the meeting on the 25th inst. Without entering into a discussion on the inferences you give expression to in your letter I would remind you that so far as the allegations made against the directors are concerned they have been fully replied to in the circulars issued by the late board and by myself, and the facts and circumstances on which they were based submitted to the deliberate judgment of each individual shareholder. As you may gather from these circulars, as far as I personally am concerned, I court the fullest investigation in any shape or form of my connection with the company from the commencement, and I would refer you to my speech at the meeting of July 17, in which I purposely proposed that the directors' reports and accounts be not passed, in order that they might be subjected to any further scrutiny the shareholders might deem desirable. I may remind you, however, that with all the facts before them the deliberately expressed wish of so large a majority of shareholders as 208 members, holding 54,011 shares, representing 6120 votes, against 60 members holding 10,933 shares, representing 2553 votes, is in favour of the policy I have submitted to them—to make every effort in our power to carry on the company, and at the same time to endeavour to recover from whomsoever it may be any moneys which may have been wrongfully paid away.

Mr. J. Clare. C. S. BLAIR.

Mysore Reefs Company, 88, Bishopsgate-street, E.C., Aug. 30.

MYSORE REEFS GOLD MINING COMPANY.

Colonel C. S. Blair, Mysore Reefs Gold Company, 88, Bishopsgate-street, London, E.C.

DEAR SIR,—With reference to your favour of 30th ultimo, I must entirely deny that the allegations made against the directors have been properly replied to, and that they were submitted to the deliberate judgment of each shareholder. The report of the committee of investigation, which they distinctly stated was only a preliminary investigation, has never been considered, and the so-called replies were travesties. I am glad to hear you court enquiry, but when I remember you are one so charged with wrong doing, and when you have Colonel Lindsay as a colleague—Colonel Lindsay being the accredited agent of the sellers—I do not feel sanguine that a proper enquiry will be allowed by you or carried out. I again ask, and it is all I want to know, will you permit a proper enquiry by the shareholders, such enquiry to have power to inspect all documents, submit to counsel, and if necessary examine you? That is the only way to court enquiry as I think, and the only way to my mind to purge yourself. As to the voting, according to Mr. Foake's statement, 110,000 shares were allotted among 500 subscribers. There were actually voting at your last meeting little more than one-half (say) 64,944, leaving those not voting at all 45,056 (the number of *bona fide* shareholders who paid 20s. for their shares). If we examine the voting a little further the inequity of your position appears to me very eloquent. To make up the 110,000 shares, beyond the 45,000 *bona fide* taken, you allotted to Colonel Arbuthnot—Arbuthnot and Co. being the vendors or the vendors "corpus"—18,000 shares; to Colonel Lindsay, accredited agent of the vendors, 17,000 shares—that is 35,000 shares out of a purchase price of 50,000*l.* cash—so if Arbuthnot's found the money for these shares, as I have little doubt they did directly or indirectly, they would still get 15,000*l.* cash for the land lease, which I have little doubt is more than it would now bring. You were obliged to get these shares taken to meet Charles Stevens' wish on the one hand, though you broke the conditions of purchase shown in the prospectus, and likewise also to get a Stock Exchange quotation, to let Charles Stevens and Mr. Peter Watson's client, Thomas Stevens, sell their shares. By client I simply use the term as representing what Mr. Foakes said—*re* Thomas Stevens' shares, that Mr. Peter Watson arranged this personally. Taking therefore the above 35,000 shares and adding Stevens, there are your friends and the vendors shares representing 62,000, who it is I do not think unfair to say do not desire enquiry, and as I understand it of these you polled 54,000 shares for your side—not your full strength—and it is this position of the shares wherein I see the inequity of your position. It may be that some of the above shares have changed hands, and are held by persons paying a very small price. I can quite understand the allotters of Stevens' shares not supporting enquiry. However I only desire a full and fair enquiry, and write with this view. I cannot see that it is to your interest such an enquiry should take place, and that is why I ask you whether you will agree to it, and I want a definite reply, feeling I have perhaps sufficiently done my duty to the general body of shareholders by showing the position of matters and their directors' qualifications.

I may add, referring to Mr. Tulloch's letter, that your reply was received by me on the 31st proximo—rather received here, as I was away till Saturday—and to give the usual time to the papers, and because I was leaving I sent copy of my letter to you to the papers by Wednesday evening's post, your reply not then being to hand.

Widnes, Sept. 6. J. CLARE.

MYSORE REEFS GOLD MINING COMPANY.

SIR,—Last week's Journal contains a letter from Mr. J. Clare, of Widnes, enclosing copy of one addressed by him to me; but I find no mention made of my reply to that letter, which was forwarded in ample time to be published simultaneously with the others. I, therefore, beg to enclose copy of that reply, and request the favour of your inserting it. I have only to add that the questions raised by the report of the Committee of Investigation, which was signed by Mr. Clare (although as far as I am aware he never attended a single meeting of such committee), have been already fully threshed out, and as he omitted to avail himself of the opportunity afforded him by the last extraordinary general meeting to express his opinions thereon, I must decline now to enter into a lengthy and profitless correspondence with him, my time being fully occupied in endeavouring to successfully carry out the amalgamation scheme which the great bulk of the shareholders have declared to be for the interests of the company generally. C. S. BLAIR.

London, Sept. 7.

[The reply of Col. Blair is printed above, as forwarded by Mr. John Clare, with explanation as to delay.]

HEALTH OF EUROPEANS IN THE WYNAAD.

SIR,—In the *Mining Journal* of July 1, I notice a report from Capt. Williams, of Dingley Dell, in which, not content with speaking of himself and the mine under his care, he goes on to say that "half the Europeans in the district are sick." I do not know who appointed Capt. Williams physician-general to the Wynaad, but if he has any authority to report on the sanitary state of the district he ought at any rate to be careful about what he says. I have been nearly 12 months in the Wynaad, and have not met with a single case of fever among the Europeans with whom I have been associated. For my own part, though always—sun or rain—engaged in out-door duties, yet I have never felt better in my life, and am convinced that nothing more than exercise and temperance—essential to the preservation of health in every part of the world—are required to secure that greatest of all blessings in South India. X.

Devala, Aug. 9.

COPPER MINES OF CHILI.

SIR,—A letter appeared in some of the financial journals last March calling attention to the shares of the two Chilian Mines—Panulcillo and Copiapo, then quoted at 6*l.* and 3*l.* respectively. The profits of these companies for the current year, which in March last were to some extent problematical, are now known and published. Although the shares have somewhat improved in price, they are still very far below their real value. The earnings of the Panulcillo Mines for the months ending June are reported as 24,000*l.*, leaving, according to a notice issued by the company, available for distribution among the shareholders next month, 21,500*l.*, or at the rate of 20¾ per cent. per annum on the par value of the shares, now quoted at 6¾. The Copiapo Company notify their earnings monthly to the shareholders, but as they are not published in the newspapers, it may be interesting to give them in detail:—

1881.		1882.	
July	£1080	January	£ 1,750
August	1330	February	1,285
September	1250	March	1,575
October	1140	April	1,925
November	1280	May	1,940
December	1443	June	1,910
Total for the 12 months			£17,908
Add profit on working agricultural estate same as last year			2,460
Total			£20,368
Deduct London office expenses the same as last year			1,146
Leaving			£19,222

Or over 11¾ per cent. on capital.

It will be remarked that the earnings of the company show a gradual and steady increase. The dividend paid for the year ending June, 1881, was at the rate of 8*l.* 1s. 9d. per cent., and a balance of 7712*l.* was carried forward. The reason for carrying forward so large a balance was explained to the general meeting. The company are obliged to act as traders, sending out stores, goods, and provisions to Copiapo, where they are sold to the staff at a considerable profit. A large amount of money is thus kept constantly employed, which is not represented by capital. Some years ago, when they were in a less prosperous condition than they are at present, the company forfeited a number of shares on which the calls were unpaid. These shares might now with advantage be re-issued to the shareholders at par. I, for one, should be very glad to take my proportion and any more I could get at the price—2225 shares would realise 7565*l.*, and the directors would then have sufficient money in hand to distribute the whole profits of the mines instead of being obliged to retain a portion for capital purposes.

The present would be an opportune moment for allotting these unissued shares, and the operation would be like a bonus to the existing shareholders. The Copiapo Company has no outstanding loans or debentures. Two small quarterly dividends of 1s. per share have already been paid for the current financial year, amounting together to 4755*l.*, and a third quarterly dividend will be declared in a few days. It is clear, therefore, that the shares now carry the whole profit of over 19,000*l.* shown above.

The Copiapo Company is working a silver mine thus far without profit, but in the last report just issued this mine is referred to in the following terms:—"Lode in the chiflon sinking below bottom level, quite 2 ft. wide, and an early improvement expected." Should this silver mine develope as anticipated by the managers, the shares would of course be eagerly bought at double their present price. But leaving this out of the question, the copper mines are giving sufficient profit to justify the shares being quoted at from 4*l.* 10s. to 5*l.* per share, which price they will doubtless command when the position of the property is better understood. I give the capital of the two companies:—

	Shares.	Debentures.	Total.	Value of Shares.	Price of Shares.
Panulcillo	£200,000	£35,000	£235,000	£4 6s.	£6 15s.
Copiapo	161,670	—	161,670	3 8s.	3 10s.

If the price of the two most important Spanish mines—viz., Rio Tinto and Mason and Barry be contrasted with the price of the Chilian companies, it must be clear either that the former are too high or that the latter are too low. The Spanish mines are dependent in a great measure on the sale of sulphur, the demand for which article has recently diminished with a consequent fall in price. Doubts are entertained whether the Rio Tinto and Mason and Barry will be able to maintain the dividends paid last year. But in Chili a different process is pursued to that in Spain, the sulphur is not extracted from the ore. The Chilian mines rely, therefore, solely on the sale of copper, the price of which has ruled extremely low during the whole period in which they have shown such satisfactory results.

Rio Tinto 10*l.* shares, paying 12 per cent. dividend, yield to an investor on the present price 26*l.*, or 160 premium, 4·61 per cent. Mason and Barry 10*l.* shares, paying 10 per cent. dividend at 17*l.*, or 70 premium, give a return of 5·88 per cent.

Panulcillo shares are quoted at 6¾ or 69 premium. Assuming that a dividend at the rate of 15 per cent. per annum is paid next month (leaving 5¾ to be carried to reserve) the return to an investor on the present price is almost 9 per cent.

Copiapos are at a premium of only 3 per cent. Assuming that a dividend of 10 per cent. is paid in November next there will remain over 3055*l.*, which added to the sum brought from last year—7712*l.*, gives a substantial balance of 10,767*l.*, or a further 6·65 per cent. on the capital of 161,670*l.*

It follows, therefore, that an investor at the present price, assuming that a dividend of only 10 per cent. be paid, will have a return of 9·70 per cent.—that is, more than double the amount obtainable on Rio Tinto shares, plus accrued interest, as only 3 out of the 10 per cent. profits have as yet been distributed.

Should copper improve in value, as many anticipate it will do, the profits of the Chilian mines will greatly increase, but in any case it must be evident to those who understand the exceptionally favourable position of Panulcillo and Copiapo that the shares of both companies will be much higher six weeks hence, when the accounts to June 30 are presented to the shareholders. AN OBSERVANT INVESTOR,

London, Sept. 6.

MINING IN BRAZIL—THE SLAVERY QUESTION.

SIR,—I enclose a slip from the Rio News which I will ask you to publish. The St. John del Rey Company have freed the last of their slaves. There still exists a company which is mentioned in the extract I enclose; or if not a company some Englishmen hold slaves, and have in Minas an agent who has been quite active in his attentions to the wrong doings of others. It is a burning shame, and English residents here feel it to be so—first, that Englishmen can be found who participate in such great wrong; and second, that the English Government will allow any subject to continue in evil doing contrary to the laws of his own country. At this time when the voice of every high minded statesman here is raised against the evil of slavery it is especially aggravating to hear that we who prate much of honour know of this violation of law, and silently pass it by. I request you to publish the extract in full. ANTI-SLAVERY.

Rio de Janeiro, Aug. 9.

The long pending case of the Catta Branca Slaves *v.* the St. John del Rey Mining Company, of Morro Velho, Minas Geraes, was finally decided on appeal in the Tribunal da Relaçao on the 22nd inst. The slaves of the old Catta Branca Company which were declared free by a judicial decision in the province of Minas, with a recognition of their right to collect wages during the time of illegal enslavement, brought action against the company for such wages due since 1860. The case was decided against the company, but was carried upon appeal. The Relaçao now approves the decision of the lower court and grants judgment against the company for such wages, together with such extra wages as the slaves may recover by legal action for extraordinary time. The Court reaffirms the right of these slaves, 165 in number, to their freedom by virtue of the contract between the Catta Branca and Morro Velho companies, and not by the letters of freedom subsequently granted by the company. The slaves are therefore granted full liberty, they having been held under a judicial guardian during the progress of these suits. This decision cannot fail to give great satisfaction to those who have recognised this flagrant injustice towards these exceptionally unfortunate blacks. Legally free in 1860 by the terms of a contract between their owners, the National Brazilian Association and the Morro Velho Company, they were still retained in slavery up to 1880. Their wages during this period of 20 years, we are informed, will amount to about 70,000*l.* sterling—a goodly sum to pay for sharp management. And now that this one case has been finally settled, we beg to inform the Brazilian authorities that there are yet other cases worthy of their attention—and cases in which the honour of Englishmen are as deeply concerned. There are yet a large number of slaves in the province of Minas Geraes belonging to the extinct National Brazilian Land and Mining Association, commonly known as the Cocaes Company, which are illegally held because the English law forbids slaveholding to British subjects. These slaves, however, are hired out, and their wages are regularly received and administered by the British Court of Chancery. It is altogether likely that a brief note to the British Government on this matter will secure the liberation of these unfortunate captives.

MINING IN BRAZIL.

SIR,—Following the visit of Monsieur Monchot, a French engineer, we have now here Mr. G. M. Henty, of London, who was, I believe, sent on the recommendation of Messrs. John Taylor and Sons as one of their most reliable engineers, by the French Syndicate. Mr. Henty finds at Raposos a mine sufficiently opened, and showing ore to justify the building of from 80 to 100 stamp heads. An adit which has been pushed with great vigour for nearly a year has cut the lode at a depth, giving large reserves of ore easily and economically reached. A mill test gave lowest 5 oits. per ton of gold, and highest 10 oits.; should such news reach London from any one of the Indian mines we might hear of much of it. Mr. Henty also gave the Borges Mine a good test, and from a strong vein in the bottom of the main shaft he milled a quantity of ore which yielded over 2 ozs. of gold to the ton of ore. I have before given you the result of about 170 tons unselected ore from which 16 oits., or 1⅞ oz. of gold per ton was extracted. The Passagem mill earns a profit of 30 per cent. over all the expenses of mining and milling for the month of July.

Mr. Henty returns to Paris on the 21st inst. to make his detailed report, and it cannot fail to give complete satisfaction to the parties for whom he made the examination. In each case Mr. Henty had mill returns from ore selected by himself. These are going concerns, and I regret that they are not corporate companies added to your list of dividend paying mines. There is little else new to report. Morro Velho produce should improve if work can be recommenced in the bottom. To an outsider the introduction of "John Chinaman" does not look like a success, but perhaps when they feel more at home they may keep out of the hospital. Cuiaba is hopefully spoken of, and a slight improvement in the quality of the ore will turn the scales in favour of the company. Don Pedro going on slowly from surface work. I have not yet succeeded in finding any trace of Mr. Del Mar, or where he made his exhaustive examination of all Brazil, nor do I see that he has not disclosed the place where our gold supply is to come from. MINAS.

Ouro Preto, Brazil, Aug. 9.

MINERAL RESOURCES OF COLORADO.

SIR,—I beg to call attention to a letter in the Times on Aug. 26 from its correspondent at Denver, Colorado, dated Aug. 5, the publication of which I think would be of very great interest to your readers. The following paragraph will furnish some idea of the immense mineral resources of Colorado. The correspondent says:—

The National Mining Exhibition which opened here on Tuesday is a unique and important enterprise. In respect of the capital employed and the money yield, the mineral industry ranks second among the great industries of the United States. Yet this is the first attempt that has ever been made to bring together a display of the products and machinery of mining. It is estimated that the mere raw products of the mineral industry in the country do not fall short of $400,000,000, or (say) 1,000,000*l.* annually, and the yield increases each year. Since the discovery of gold in California in 1849 the production of gold and silver alone, as reported by the transportation companies—for the Government have no more responsible authority on which to base an estimate—has aggregated about 515,000,000*l.*, which is but 1 per cent. of the possible yield. The State Geologist of Colorado thinks that one-half of 1 per cent. is a fair estimate of the mines already discovered, in comparison with the available mining territory. Figures are burdensome; still, working with the 1 per cent. computation, it will be seen that the remaining 99 per cent. of the mineral territory can fairly be estimated as capable of yielding the practically incomprehensible amount of 50,788,000,000*l.*, or 11 times as much as the total world's product of these two metals, and 15 times as much as the product since the discovery of America. The yield of precious metals has, of course, been continually growing with the progress of civilisation. According to Dr. Soetbeer one-third of the whole amount produced since the discovery of the continent has been mined in the 45 years between 1830 and 1875. Indeed, the yield of the United States since 1849 is about one-sixth as much as the yield of the whole world for the 388 years since Columbus landed. It is, therefore, argued that if the splendid mining industry be conducted on the basis of other industries, and the same wisdom, common sense, and business tact be brought to bear on it development, some considerable portion of the millions of dollars of available mineral can be dug out of the ground in a comparatively short period, an hypothesis now removed from the region of theory to that of fact by the strides mining has taken during the past two

years. In natural resources the Rocky Mountains contain a varied and practically inexhaustible supply. The number is only limited by the incomplete examinations which have been made from time to time. Each year brings to light new deposits not only of precious metals but of other mineral substances of great commercial value. It was only four years ago that the rich carbonates of Leadville, in this State, were discovered, and in 1880, or two years afterwards, these being the latest figures I have at hand, the bullion produced by the Leadville smelters reached considerably over 3,000,000*l.* sterling in value. Within this wide region of the New West there are many native products besides precious metals—all with more or less commercial value—that are now wholly or partially neglected.

The whole letter, however, is replete with information and statistics of the highest importance to all who are interested in mining, and particularly in the production of gold and silver.

London, Sept. 1. FRANCIS A. SANDS.

RICHMOND CONSOLIDATED MINING COMPANY.

SIR,—I am not naturally of a suspicious temperament, but I cannot help thinking that recent events are somewhat tinged with what I believe is technically known as "manipulation." Omission is probably the gravest sin ascribable to our directors; but, unhappily, its results are as mischievous, if not more so, than that of commission. The shares gradually advanced in price from about 8*l.* to 11*l.*, apparently without any reason. But one morning after the advance had taken place the shareholders received an official circular announcing the payment of a 5s. dividend, and (what was evidently intended to be regarded as of more importance) the discovery of rich ore in one of the deep levels. Since then the shares have receded to the former price—8*l.*, and I am informed that heavy sales have been made. Shareholders have not received any intimation that the reported discovery has proved valueless—indeed, no further notice has been taken of the matter. I observe, however, by what appeared in your valuable Journal of Saturday last "that the finances are likely to be closed," and "that no further returns of ore will be made until next spring." And not even then, if discoveries are not made meanwhile. Strange commentary this upon the "pleasure the directors had in communicating such satisfactory information to the shareholders." Discoveries are problematical—if not made pending suspension, if smelting a disastrous collapse appears inevitable. Our well-paid directors should at least apprise us of current facts.

A SHAREHOLDER.

BRATSBERG COPPER MINING COMPANY

SIR,—Last week's Journal contains a letter from "Inquirer" about the above company. I presume the writer of it is not a shareholder or he would know more than doth appear. He writes that in June, 1881, it was stated there were 500 tons of 21 to 22 per cent. of copper ore on the floors, and he is surprised that being so more ore has not come to hand. Now, whatever ore was on the floors June, 1881, has little to do with our company, as the mines did not come into our possession until November, 1881. From that date the ore raised accumulated until the spring of this year, and then with milder weather the dressing commenced and the carriage of the ore down to the port of Skien. Already two cargoes have been sold in England of a total value of 5330*l.* Another cargo of equal quality is on the sea, and may be expected here in a few days, and others will follow so long as the steamers run on the lakes. Well as the company is now doing it is nothing to what is expected next year, as up to the present time the output is restricted by want of winding power and other mechanical means. These erections, however, are fast drawing towards completion, as will be seen by Capt. Daw's last report dated Aug. 1. In addition the shareholders have recently had a report sent to them by an independent mine agent, who states that "there is 100,000*l.* worth of ore laid open and immediately available for returns." Take this, in addition to the miles of virgin ground yet to open out, and I think "Inquirer" will be at some trouble to find another copper mine to match the Bratsberg. No one can expect the company to be in the Dividend List before 10 months have passed over its working career and before the new machinery is erected, but this will soon be effected and shares probably double their present price.

ONE WHO HAS VISITED THE BRATSBERG MINE.

MINING IN IRELAND—IMPORTANT SILVER-LEAD DISCOVERY IN GALWAY

SIR,—I see in the Journal of Aug. 26, Capt. Joseph Phillips's report of the rich and unexplored ground at Maam in the county of Galway. I was called over from England to inspect this mining property, and on Aug. 11 I spent a long day in going over and examining every point of interest. The mining sett I am told is near 1000 acres. Well, in my long life of 66 years, and being a miner, and during that period I have had the management of mines for 35 years, I have been called on to inspect old, young, progressive, and new and virgin ground hundreds of times, but never in my long experience did I ever see such a rich mining sett as the Lough Corrib mining property, Maam, County Galway. The lead ore is cropping up to surface in every lode, which are numerous; the composition of these lodes is all that can be desired, they are large and strong, and the ground, which is a beautiful light coloured clay-slate, is very good for exploring, and requiring scarce any timber everything points to great riches. Capt. Phillips has had one of these lodes opened on for 5 fms. in length and 7 ft. deep, and there is a lode of lead standing for the whole length of the 30 ft. that will produce fully 4 tons of silver-lead to the fathom. All these lodes already discovered, and many more no doubt will be discovered, will form junctions with this great north and south lode, and where this great silver-lead ore body is, or within a few fathoms, and must no doubt produce immense bodies of ore. The fact is it cannot be called anything else but a mountain of silver-lead ore.

But very little capital will be required to work this mine or mines, as the sett is large enough for two or three mines; the only thing to be done is to make dressing-floors and tram road to put the ore on board the steamboat; there is plenty of water-power, no steam-power wanted for anything. The mine can be worked by adit levels, and worked dry. The mountain is from 80 to 100 fms. high, therefore 100 fms. of backs will be obtained and that a dry mine for 100 fms., and when the mine is opened up by the adit, as far as I can see and believe, there can be raised almost any amount of silver-lead. I repeat such a property I never before saw, and such facilities for working it.

I need not at this time go into all the good things connected with this mining property, as Capt. Phillips has left no room for me to say much, but this I can say with all truth that I can verify all that he has said and written about the property. By your permission I will say more on this mine and the mineral resources of Ireland shortly, as I know the country well, having had 14 years experience and the management of mines in Ireland for that period.

JOHN PHILLIPS,
Manager of Newlyn United and other Mines.

Newlyn, East Cornwall, Sept. 5.

FOWEY CONSOLS, AND ST. BLAZEY DISTRICT.

SIR,—I am pleased to be able to announce that a sale of tin from the above mine took place on Friday last, and some of the inhabitants of St. Blazey seemed somewhat startled on seeing carts loaded with such heavy stuff in small bags; but on enquiry it was found to be tin from Fowey Consols, but some were hard to believe this statement, as there are those that have formed an idea that there is little or no tin in the sett, as they say had there been any the former workers would have taken it away; but this is not the case—this sale has proved it otherwise, in spite of croakers. I cannot state the exact quantity of tin that was sold, or how much money was realised by the sale, but have been informed that it brought the best price, over 60*l.* per ton. More would have been sold had the burning-house been erected earlier, as there is a quantity now ready for that process. Although there has been in former years so much mining and such large dividends paid in this district, this is the only company that has shown any spirit of enterprise to the east Wheal Eliza, and I sincerely hope they will be well remunerated for their outlay, and I do not think there is a doubt but what they will, as their energetic manager, I am informed, is now driving levels north and south of the lode they are working on, where there are good stopes to take away. There must be numerous lodes to intersect, and a rich piece of mineral ground. J. H.

PROGRESSIVE AND DIVIDEND PAYING PROPERTIES.

SIR,—It is noteworthy how many poor concerns, not paying a dividend and not ever likely to pay one, are in apparent favour on the Stock Exchange, and are the subject of frequent dealings and quotations in the Daily List, and have plenty of that up and down movement which makes the game of speculators, while there are some really sound and good concerns which are apparently lifeless, and dealings in which, though they often occur, are seldom or ever noticed in the lists of the daily market. And this happens because these latter concerns, being steady in price, and, therefore, good for solid investment, do not suit the Stock Exchange men, who do not look so much to solidity as to plenty of oscillation, out of which they make a continual profit. I will not attempt to name the poor concerns, as I should only bring about me a swarm of hornets, and the public ought to find them out for themselves; but it is a service to the public to point out a few among the really sound and good concerns, and to ask people to make further enquiries for themselves, and see whether what is advanced is or is not justified by facts;

As a beginning I will name the 15 per cent. preference shares (of which there are 55,000*l.* of 1*l.* each, all taken up and fully-paid) of the Yorke Peninsula Copper Mining Company. This company has been in existence about 10 years. It possesses nearly 1100 acres of most valuable and productive mineral land in South Australia, close to a seaport, and with railway communication therewith, and also including a township much built upon, and a large quantity of valuable machinery, five engines, plant, &c. The mine has been developed in a regular miner-like way to a depth of over 60 fms. in one part, and with gradually improving results, so that it is now producing annually between 3000 and 4000 tons of copper ore of about 15 per cent., and this ore is being raised at various points so as to average its produce.

Last year, for the first time, a dividend of 15 per cent. was declared at the annual meeting on Dec. 8, and judging from the fact that the rate of produce has been since fully maintained, and the price of copper has been rather better than it was last year, it is highly probable that within the next three months—at the annual meeting in December next—a second dividend will be declared. And if the price of copper should still improve the dividends would, doubtless, increase accordingly. I should also state that arrears of interest are due on these preference shares amounting to about 12 per cent. per share, and which will have to be paid off in addition to their own special dividend, which is constantly accruing. It should also be mentioned that on the Bon Accord portion of the property of the company a discovery in the nature of an outcropping lode has recently been made, which seems likely to be of great value, and of which more will be heard ere long. The board of directors is composed of able, steady-going men of business, well known in London, who seriously attend to the concern, and whose only fault is that they do next to nothing to bring the company into public notice by calling fair and proper attention to its real merits. The secretary is Mr. C. Strange, who is always to be found at the company's offices, is very accessible, and obliging to those who apply to him for information about the company and its affairs. I can, therefore, fairly say that the above is a *bona fide* concern, at last, after many years, emerging into a dividend state. Such is one of the few good things to be had at present. Let any reader of this letter enquire promptly for himself, and he will see that all I have advanced is correct, and justified by facts; and so I leave the matter to its real merits, which will speak for themselves.—*Ramsgate, Sept.* 6. Y. Z.

SHROPSHIRE LEAD MINES DISTRICT.

SIR,—As a reader of the *Mining Journal*, my attention has been called from time to time to some allusions to the Shropshire group of mines; and of late "Miner" has taken the matter up, and he informs us readers there is such a place as a Shropshire group of mines, but he does not explain what the past results have been, neither does he inform us what is likely to be—in fact, he gives but a faint description of the locality or the mines in the locality, which I think would be wise to do; and in making a tour through the district I will give the readers of your valuable Journal a little of what I saw, with information from some reliable old miners.

Alighting at a pretty village called Minsterley, I was directed on to the Snailbeach Mines, where there are mounds or hillocks of an immense size, showing it has been a mine for many years. Here I commenced my enquiries, and found this mine had been in constant work for over a century, and is now only 250 fms. deep; this at once spoke for itself that it must have been a rich mine, and one not likely to be exhausted, for I found a splendid piece of machinery newly erected for exploring purposes, showing there is yet prospects of a lasting mine, as I was informed there are several lodes in the sett not as yet proved, which may be equally as rich as the lodes now operated upon. Half a mile or so from the latter is a mine called Central Snailbeach, with some costly machinery attached to it, but idle in an indirect manner. I made some enquiries about this mine, and found it had only been sunk to a shallow depth, and its drivings limited; it is the opinion of many well versed in mining that this would become a rich mine, like its neighbour, were it operated upon. I must here say it only requires a small amount of capital, combined with economy, to prove this valuable sett. A little further south-west are two more mines, called Mytton Dingle and Perkins Beach; these I consider fine trials, as they have the Stiperstones upon their backs, and many hundred tons have been raised close to surface, especially from the latter. This mine is only, as one old miner expressed it, keeping tail in water, only requiring capital to make it A 1 in the district; there is every facility for working this valuable sett, being in close proximity to the Snailbeach District Railway; this enhances its value. A personal visit by mining gentlemen would be sufficient to prove this assertion.

Finding my time was limited in travelling on, I dropped my foot all at once upon the Tankerville Mine; here was a specimen worth looking at. To show the manager of this mine was one possessed with great abilities and skill, everything seemed to be in perfect working order, and every man at his post. This mine I learned had produced one of the greatest deposits of lead ore ever found in the Shropshire group of mines; and from what was being raised to surface there appears to be not much lack yet. This mine I find is combined with two great and important mines called Bog and Pennerley, which have been noted for their richness for many years, and now in a state of infancy compared with the trials yet that can be made.

Having satisfied myself that the Stiperstones range of mines had not as yet come to the age of maturity, I leave it in the hands of "Miner" or some one more competent than myself to give a fuller description of the mines and the lodes traversing through them, as there are other setts in the district equally as important as those alluded to now standing idle for want of capital to prove their value. Leaving the Stiperstones I found myself upon a mine called the Grit; here were a few old men turning over the waste and washing portions, finding a little lead ore and barytes. Asking a few questions, I was soon informed with their broad dialect that this mine is one which deserves special attention. These old miners said—"Bless your soul, mon, there is thousands of tons of ore yet in this myne that oll be got some day or other when our yeds are laid low." This I also believe, as it is a fine sett, and well worthy the capitalists' attention.

Travelling the road back to where I alighted, my guide pointed out several little mines of which I must for the present leave, and wind my way to the Roman Gravels, which is so called from its ancient history, having been operated upon more or less from the time of the Romans, but with no great success until it fell into the hands of the present company, whose great mining minds and abilities are well known in Shropshire. This is now the richest mine operated upon in the locality, and with its masterly lodes no one can doubt its stability as depth is attained, as it is only a shallow mine compared with some of the mines. "Miner" informs us there is a mine called Roman Boundary, now commenced, but failed to say where, only that a new shaft was sinking. Now, this mine is within a short distance of the celebrated Roman Gravels—in fact, the Roman Gravels old engine-shaft is only some 30 or 35 fms. from the boundary line, with nearly all the lodes from the above-named mine, and the lodes, four or five in number, from East Roman Gravels running north and south into this sett, it cannot, as the old miners say, fail to be a productive mine, and as this was the only new trial seen, may the promoters have their desired object. Passing on I noticed a little mine on the right—Hope Valley. This, like many others, is at a stand still, and perhaps in your next Journal "Miner" will give some more accurate information why out of the 20 he named so many are now in a dilapidated state?—*Sept.* 6. CORRESPONDENT.

SHROPSHIRE LEAD MINES.

SIR,—We may expect a good report from Tankerville Great Consols this week. The cross-cut to the lode at the bottom of Tankerville shaft is driving into a rich lode this week, and from what we learn there is every indication that the lode is resuming the character and productiveness of levels above, when they made some 50,000*l.* profit in a short time. There is very little water in this mine, although it is considerably over 500 yards deep and on a wide lode. We shall soon hear of them reaching the bottom of the Bog Mine, and they have a good lode there to sink upon. We hear that there is a good discovery of lead ore, carbonate of barytes, and sulphate of barytes at the West Roman Gravels Mine, in the western ground, where the lode is said to be 10 ft. wide, and these three minerals are found together. This is quite a new run, and, in fact, very little has been done at all in the western portion of the sett. We very much wonder that this mine is not worked more vigorously, for the indications are very favourable and the sett has been inspected by the best judges of the district, who have given very favourable reports on it. MINER.

GOGINAN SILVER-LEAD MINE.

SIR,—In the course of a holiday ramble amongst the Cardiganshire hills I have just paid a visit to this celebrated old mine, and I should like through the medium of your valuable paper to give my fellow shareholders, who may not have visited it, some idea of the extent and importance of their property. I was much impressed on approaching the mine from the main road with the enormous extent of the heaps of attle or halvans which demonstrate the vast quantities of ore that must have been extracted from the mine and passed through the various processes of washing and dressing. I was also much struck with the contrast between some of the old machinery still on the ground and that erected by the new company, from which it is apparent how vast an improvement has been made in these matters. The regularity and harmony with which the whole of the crushers, jiggers, buddles, air compressors, and other appliances work, and the comparatively small amount of manual labour required considerably surprised me. One immense advantage enjoyed by this mine is that the whole of the machinery, including all the powerful pumping and hauling machinery from the bottom of the mine (about 70 fms. below the adit), is worked by a splendid supply of water-power brought in conduits and water-courses from the mountains in the distance. I believe I am right in saying that this supply of the cheapest of all motive-powers is never failing even in the driest summers or in the hardest winters, consequently the company has an advantage not possessed by hundreds of mines in the kingdom, the value of which is in itself equivalent to a good dividend upon the capital employed.

The captain of the mine was exceedingly attentive, and took great trouble to explain to me the various processes the ore passes through, and the uses and working of the machinery. I was much interested in the air compressor for working the patent rock drills which are being employed in driving levels and opening out new ground There are many large buildings on the mine used as carpenters' and blacksmiths' shops, stables, storehouses, cottages for miners, counting-houses, ore sheds, &c., the latter being capacious enough to contain hundreds of tons of ore in its finished state, and are, I hope, an augury of the future returns we are to expect. There was at the time of my visit a nice parcel of rich ore ready for market, and good reserves are I understand being accumulated in the deep parts of the mine.

After walking all over the surface and viewing the water-courses, which are some 10 or 11 miles in extent, and the numerous water-wheels which are of great size and enormous power, one in particular, recently erected, being. I believe, the largest in this part of the kingdom, I donned a miner's dress and descended the western shaft to the 40 fm. level where I saw the patent rock borer at work. The compressed air for driving it is conveyed from surface, and I was astonished at the ease and rapidity with which holes were drilled about 2 ft. deep in the hard rock. I understand that by this process from 10 to 12 fms. of ground are being driven per month, which is about three times as quick as the work could formerly be done by hand drilling. I also passed through the new workings connected with Francis's shaft, where there is a very fine course of ore producing rich silver-lead. I next visited the 10 fm. level which is being driven on the south side of the lode, containing every favourable indication for the production of lead in large quantities. This lode it is intended to cross-cut shortly, and as it is immediately under one of the richest stopes worked by the former proprietors great results are anticipated. The 70 fm. level has been driven some distance, and a cross-cut is being made to intersect the lode at this depth, which it is expected will be reached in about 3 fms. I also passed through some of the old workings, and saw the enormous cavities from which the lead has been taken away; they are of immense extent, and must have been the labour of generations. From the abundant indications in the mine, apparent to the merest novice in mining matters, assisted by the evidence of skilled miners born and bred on the spot, I am perfectly satisfied in my own mind that the riches yet to be extracted from this grand old property are practically unlimited and far in excess of the past enormous returns, amounting in the aggregate to over 400,000*l.* Time is all that is required for their development, and as the company has ample capital and possesses the best scientific and practical management I have no doubt as to the results. I may add that the ventilation throughout the mine, even directly after blasting, is far better than that of the underground railways. I hope before long to have an opportunity of paying a more extended visit to the mine, at which one might profitably spend the best part of a week, so extended are its various departments.

In conclusion, I strongly advise all of my fellow shareholders, who may be spending their vacation within reasonable distance of the spot, to do as I have done, and I am sure they will be amply repaid for their trouble. Having for the present finished with mining I am going to have a few days fishing, but shall probably have another peep at some other of the Cardiganshire lead mines before my return home.—*Aberdovey, Sept.* 5. MINING TOURIST.

THE UNWROUGHT MINING GROUND OF CORNWALL.

SIR,—It is patent to all who know Cornwall and its rich families that their positions and wealth are due mainly to opening the new or unwrought ground in the several districts throughout the county. The celebrated Tresavean Mine in Gwennap, when started in the year 1833, took an outlay of only 1000*l.* to give the proprietors a little over 60,000*l.* profit in that year; from that time to the year 1864 (when it ceased working) returned mineral amounting to 1,407,387*l.*—giving a profit of over 500,000*l.* The Great Consols, in Gwennap, which started in 1815 on a mere nominal outlay, raised and sold up to 1857 2,878,908*l.* worth, giving over 1,000,000*l.* sterling profit. Further west on these lodes Wheal Damsel was opened by an adit level being extended many fathoms on their course, which showed indications of riches at no very great increased depth; a shaft was sunk 20 fms. below this said adit, where the mineral was struck,, which produced in one year 50,000*l.*, giving a profit on the year's working of 36,000*l.*; subsequent total profits exceeded 160,000*l.* The same lodes skirt the north flank of Carnmarth granite range in decomposed granite now being developed by the Cathedral Mining

Company, with every prospect of success. Some rich bunches have been found near surface, which are sure precursors of something good below; sinking is being spiritedly carried on with this object in view. Still further west these lodes are in Mount Carbis Mine, on which a shaft has been sunk 50 fms deep, where the lode is masterly, being 12 to 14 ft. wide, and may fairly be called a great course of tin, confirmed from the fact of somewhere about 800*l.* worth having been raised and sold within a little over three months, from opening a few fathoms of ground, such opening so far as gone laying bare a mass of tin gone down, which when reached by a deeper level will, without doubt, open another productive mine, for which these same lodes have been and are so celebrated. Extending further west on same lodes you reach the Illogan district, the Great Flat and other lodes of Wheal Basset, West Basset, South Frances, and others are the same; these mines are still working, their past profits and present state being the best guide of their prospective value.—*St. Day, Scorrier, Cornwall, Sept.* 7. CHAS. BAWDEN.

BODIDRIS LEAD MINE.

SIR,—Can any of your readers inform me what has become of this mine? I was induced a few months ago by a certain firm to take shares in this promising concern. The shares are not now quoted in the Journal, and I have written to the secretary but without result. Any information on the above will oblige. B. N.

Sunderland, Sept. 4.

KILLIFRETH MINE.

SIR,—Referring to the remarks of Messrs. Watson Brothers in last week's Journal I am not disposed to question the ground they take against speculation in dividends, &c., although if fairly done I see no reason why this kind of speculation should not be indulged in. People generally like to have as good a dividend as they can, whether they have bought them or not. Messrs. Watson Brothers have quoted the above mine as an example of the ruinous way in which Cornish mines are being conducted. I attended the meeting in question and voted for the smaller dividend, considering it would be the better for the mine generally; but still I maintain its financial position is a sound and good one, and that part of the business is conducted by the purser in such a clear and business-like manner that might be copied with credit and advantage by many a mine in the county, some of them probably the leading ones—

The profit on the 16 weeks' working was	£1454	4	4
Dividend on forfeited shares	3	2	6
Forfeited shares sold	151	0	0
Balance from last account	287	3	7
Balance in hand	£1895	10	5
Against which a dividend of 6s. per share was declared, absorbing	1800	0	0
Leaving a balance of	£95	10	5

Instead of as at the previous meeting 287*l.* 3s. 7d., or lessening the balance by 191*l.* 13s. 2d.

There were, I am bound to admit, some reasons for thus encroaching on the balance of the previous meeting. During these 16 weeks over 600*l.* had been laid out in new pit wood, new calciner, &c., all of which was charged in this account, entirely new work, of course, which will certainly last for many years, and the payment for which in most other businesses and in a good many other mines would have been extended over a longer period. Some of the shareholders at the meeting in question contended, rightly or wrongly, this outlay was much if not more for the future benefit of the mine, and the present shareholders should not be called upon to pay the whole of it. I do not mean to contend that it might not be at least more convenient to the purser to have a larger balance in hand, but I do mean to say that the procedure was not of such a ruinous nature as Messrs. Watson Brothers would have us believe. Everything is charged up to the date of meeting, and no tin credited but what had actually been sold—with 3384*l.* 18s. 7d. in bankers' hands, and due from tin buyers 447*l.* 1s.—so that the purser was in a position at the meeting to pay off all the liabilities, including the dividend then declared, and have a balance of 95*l.* 10s. 5d. in hand.

Messrs. Watson Brothers conclude their remarks with this "leaves the mine to be carried on with borrowed money or debts unpaid." Whereas there will be no debts other than the current costs of getting the produce, and the regular sales will come against these current costs. I think Cornish mine management would be very much better than what it is if there were no worse specimen than that which Messrs. Watson Brothers have chosen for their denunciation. I have watched the progress of this promising mine for some considerable time, and can bear testimony to its careful and skilful management, and I believe what it has recently done is but a tithe of what it will achieve in the future, for I am confident the day is not very far distant when it will run the foremost mine in the county and have far the topmost place in the Dividend List.

A SHAREHOLDER.

MOUNTS BAY CONSOLS, AND OLD SHEPHERDS MINES.

SIR,—I have lately visited these properties, and wish through the Journal to inform my fellow-shareholders that I am perfectly satisfied with the prospects of the undertakings. I have had some experience in mining matters, and I can safely assert that I never saw such a large amount of judicious work accomplished in so short a time by any mining companies with which I have been connected. The surface works are constructed in a most scientific manner, combining strength, economy in time, and every facility for stamping and moving ore which modern science can devise. At Mounts Bay Consols I find that the mining captains in their last reports have by no means over-estimated the returns the mines are able to make. I consider that at Sydney Cove the estimate of 28 to 35 lbs. of tin to the ton of stuff is much too low, and I believe that 40 to 45 lbs. to the ton is nearer the mark. The copper lately sent to market is but a forerunner of immense quantities which can easily be broken and regular and frequent parcels sent, which parcels will be of excellent quality. At Old Shepherds the drainage of the mine is virtually accomplished, and the shareholders need no longer fear the adverse opinions which have been expressed by those who wish to replace our present board of directors. Lead from the burrows is being dressed, and I have no doubt but that the opinion expressed in the prospectus that large profits would be made from this source will be fully realised. The returns from the shallower levels (already being worked upon) will, I am quite sure, return sufficient ore to pay large dividends on the whole capital. I found at both mines a strong feeling among the officials and workmen that success would attend their efforts.

Brighton, Sept. 6. DAVID TREHERNE.

NEW GREAT WHEAL VOR.

SIR,—This is one of the three mines recently re-started by a few gentlemen of London, who have a well-founded faith in the Great Wheal Vor district, in which, and near to which celebrated mine, this is situated. The ancients, as in most of the mines in Devon and Cornwall, commenced to open the lodes, or some of them here, at a very remote pre-historical period, and they must have found them productive, or it is not probable they would have incurred the expense of cutting a deep adit ½ mile in length, in addition to a shallow one for draining the mine 20 fms. from surface. Between this adit and the surface all the contents of at least one of the lodes for a considerable length have been removed and carried off the premises, doubtless, for reduction and metallurgical treatment. For want of knowledge in the ancients of the means of drawing off the water below adit—the steam-engine being then unknown—very little has been done under the deep adit level. There is sufficient evidence in the tinstone found in the lode to warrant the erection of a steam-engine to pump the water, and to reduce the tinstone, abundance of which is at command. Accordingly an engine has been purchased from Messrs. Harvey and Co., the celebrated manufacturing engineers, of Hayle, of sufficient size to enable the workers to excavate the lodes to a good depth under the adit. The proprietors are fortunate in obtaining that engine, which is nearly as good as new, at a very low price It will be removed almost immediately from its present location and erected on this mine, under the supervision of Mr. Eustice, the engineer, and Captain J. Prisk, the manager. As to the "resident" agent, so called, he is regarded as an honest man; but his services rendered to the company are not very valuable, because he lives in Camborne, and is never on the mine before noon, and sometimes not at all for the day. When the operations are enlarged the proprietors would do well to secure the services of an agent like Capt. Ridington, of North Metal Mine, who is there every morning before 6 o'clock, and who has shown in what he has done at that mine superior mechanical intelligence, as well as great industry.—*Sept.* 6. RESIDENT.

PHŒNIX UNITED TIN AND COPPER MINES.

SIR,—The statement of accounts and report, at the meeting held last week of the above, gave great satisfaction. The various points working are worth in all 599*l.* per fm., thus proving the richness of the mines for tin. They have been worked 70 years, and yet they are not worked out. They have a splendid lode in the 60, in the western part of the mine, valued at 80*l.* per fathom—it is worth 100*l.* per fm. This part of the mine bids fair to equal the eastern part, from which nearly the whole of the 206,400*l.* has been paid in dividends. Here is a splendid property, in 12,000 shares, with plant costing 70,000*l.*, selling at 3*l.* 10s. per share (42,000*l.* for the whole concern as it stands), and paying regular dividends, with a certainty (tin being at present price only) of doubling such dividends. AN INVESTOR.

ANOTHER INTERESTING DISCOVERY OF SILVER IN THE CALLINGTON DISTRICT.

SIR,—It has been already mentioned in the *Mining Journal* that two young silver diggers have lately thrown their picks into a rich branch of silver ore at Wheal Fortune: I will further remark that this mine, formerly named the Queen, or Wheal Newton, adjoins the Prince of Wales Mine; that there are two champion silver veins situated in an ordinary stratum of clay-slate, not far from the granite of Kit Hill and Gunnislake, and that these lodes, formerly called Wheal Duchy and Wheal Vincent, are now named Wheal Brothers and Wheal Langford, or the Well Lode. But both of these lodes, it must be noted, dip south. They usually carry a fine brown gossan on the back, which might easily be mistaken, in the absence of the assayer, for a common copper gossan. And, lastly, both lodes are very rich, each of them having produced many thousand pounds worth of all sorts of very valuable silver ores, including horn, grey, and even that, the most valuable of all — the pure white, or tough wire silver. As there are many intelligent miners living in the district, I hope we shall soon be favoured with a few scientific remarks from some of them to stir up this department, which, in my humble opinion, has been sadly neglected.

Sept 7. AN OLD AMATEUR.

THE PATENT LAWS.

SIR,—Most persons are ready to denounce these laws, but it appears to me that whatever their merits may be, this is often done with very insufficient knowledge of the facts respecting them. One set of writers and speakers tell us that the working classes and those not possessed of much means are great sufferers under the present system because they cannot afford to protect their inventions in consequence of the present high scale of fees, the result being that they are unable to secure any right of property in their inventions. We are told that if the cost of provisional protection were made much less it would be a great boon as enabling poor inventors to offer their inventions in the market without incurring any risk by exposing them. I am decidedly of opinion that the present scale of fees for provisional protection is much too high; but if your correspondent Charles Harvey is correct in his figures, it is perfectly clear that, even after protection has been obtained, it fails to bring prosperity to the vast majority of inventors. Mr. Harvey says that, out of 107,628 patents granted during the last 29 years, 100,733 had to "succumb to exhaustion," and leaves us to infer that it is in consequence of the high scale of fees payable at the various stages of the life of a patent. I entirely disagree with your correspondent, for it appears to me that, unless the inventions are really valuable in themselves, the mere lowering of the fees will not arrest the mortality amongst patents; but, on the contrary, I believe that when the number of patents is largely increased through the lessening of the cost in obtaining them, the mortality will continue in almost the same proportion

It must be perfectly clear to anyone who has given even a little attention to the patent question, that Mr. Harvey's acquaintance with the subject is of a very elementary character, or else he would never have stated that the fact of a provisional protection having been filed was evidence that the invention so protected "must have existed in a practical mechanical form before the application could be made." As a matter of fact, I believe the patent agents of this country would be able to show that a very large proportion of ideas provisionally protected never get beyond the ideal stage.

I may, perhaps, claim to have had as much experience with inventors as any manufacturer in Birmingham, and I have no hesitation in saying that fully 50 per cent. of the inventions submitted to us are either impracticable, worthless, or have been anticipated. In a vast number of cases it would have been a happy thing for the poor inventor if the cost of obtaining provisional protection had been ten times greater, instead of being less, for he would then have been saved infinite disappointment, to say nothing of the loss of the high fees at present charged. No one but a patent agent, or a manufacturer who is known to take up new and useful inventions, can form any idea of the large number of crude ideas which have been considered worthy of a patent. The first question I put to an inventor is, "Have you made a working example of your machine?" The answer is almost invariably in the negative, coupled with the assurance that he (the inventor) is "perfectly sure his invention will work," and that it is quite unnecessary to make one to prove it. Since my firm brought out the differential pulley-blocks in 1859, we have had a large number of so-called improvements and modifications brought to us—in almost every case we have been able to prevent the inventor of these improvements from wasting any more time or money by taking him to a room and showing him his idea already worked out and proved to be impracticable. If the position of a patent agent towards inventors was the same as that of a manufacturer, and if he adopted my practice, there would be much fewer patents "succumbing to exhaustion," for they would never reach the stage of provisional protection.

Mr. Harvey would have us believe that the cause of the great mortality is the existence of high fees. I think it would puzzle him to enumerate 500 useful inventions out of the 100,733 which have lapsed during the last 29 years before reaching their seventh year of patent protection; it would be much nearer the mark to say that they have "succumbed to exhaustion" from lack of vitality in themselves. The fact is, a vast number of these so-called inventions are no inventions at all; they are simply parasites emanating from a class of men who are always on the look-out for new and real inventions, in order to parody or imitate them, or to put an excrescence upon them; but they have no more title to be called inventors than barnacles on a ship's side are entitled to be called improvements upon a good ship.

Your correspondent says that out of the 12,000 patents taken out in America in 1880, not one is reported to have dropped from exhaustion or otherwise. The cause is not far to seek. The United States Government grant no provisional protection to foreigners, but one payment covers the whole term of the payment. Does Mr. Harvey wish us to believe that there are no unsuccessful or impracticable inventions in America? I have no doubt it would be found on enquiry that the proportion of such failures is as great in America as in this country, but they do not appear to be recorded.

In my opinion it would be a great misfortune to this country if the system of granting provisional protection were abolished, and the patent secured from succumbing to exhaustion by a single payment covering the whole term, for the result of such an alteration would be to enable the owners of dropped or unsuccessful patents to act the part of Mr. Warton in the House of Commons by blocking the progress of other inventors on the dog-in-the-manger principle. If an invention lacks vitality, it is better that it should die, and not cumber the ground.

The main advantage of patent protection is to give those who have it a good start in the market, with sufficient time to get over initial difficulties, and to get into the most economical method of working the patent. When this stage has been reached, the prudent manufacturer will rely less and less upon this protection, and more and more upon his powers of economical production and reasonable charges—reasonable as compared with cost of production—and taking little more profit because of the patent protection. Where this course is adopted the largest possible sale is obtained, and opponents are not tempted by high prices to bring out something in competition. One word as to one effect upon working men of greatly lowering the cost of obtaining patent rights. Where *bona fide* inventions are concerned there can be no possible objection; but what can be said in favour of the following advertisement which is widely published: "Practical improvements discovered by operatives in their work patented and worked free of cost for share in the result. Apply, &c."

Here is a direct incentive to draughtsmen and operatives to take advantage of any improved method, process, or design, which they may be employed in carrying out to patent it in their own names, or, as a blind, in their patent agents' names, behind the backs of their employers, and then to use the patent rights so acquired to prevent the latter from continuing to use the process in question. In the interests of the country it would be much better to abolish patents altogether than that such practices should become general. On more than one occasion we have suffered in this way. Having directed employees to carry out certain suggestions, leaving the details to their own judgement, they have protected the work for which they had already been paid by us, and have then proceeded to discuss the terms upon which we should be permitted to use what we had already bought and paid for. RICHARD TANGYE.

Sept. 1.

PRESERVATION OF MINE TIMBER.

SIR,—An article was published in the *Mining Journal* a few weeks since pointing out the advantage of using asbestos paint for the protection of pit timber from fire. A suggestion more worthy of adoption could scarcely have been made, but I would add to it that before the wood is painted it should be carefully preserved with an antiseptic fluid by the combined application, and the timber would be equally protected from fire and decay. I am not altogether disinterested in this matter, for a friend of mine—Mr. S. B. Boulton, of Cannon-street—has an invention which relates to the production of certain new compounds for preserving timber, and to the treatment of the timber with such compounds; and it has for its object, firstly, to improve the efficiency of certain timber preserving processes by exhibiting the tar acids, naphthaline, products of distillation of the heavy oils of tar obtained at a temperature exceeding 500° Fahr., and other preservative substances in a new form, and in combinations different from any in which they have been heretofore employed; and, secondly, to decrease the cost of timber preserving in those countries where a sufficient supply of the ordinary timber preserving fluids is not obtainable. He separates from creosote or heavy oil of tar heretofore used for treating timber, those constituents that have been proved more particularly to possess preservative properties, and he mixes therewith other liquids that shall either in themselves possess preservative or other qualities beneficial to the timber, or that shall only serve as diluents for the concentrated extracts, and act as a vehicle to convey them into the timber. By these means he not only produces a new series of compound fluids that are of great efficacy in preserving the timber, but he obtains the important advantage of being able to transport the preservative extracts in their concentrated state at a comparatively moderate cost from a country or district where the heavy oil of tar or creosite and other preservative fluids are comparatively cheap to another where such fluids are to be applied, sand where they are not readily obtainable, in order at such localities to mix the said extracts with such other liquids or diluents as may be readily procured there for the purpose of treating the timber therewith. He thus avoids the necessity of exporting preservative fluids of great bulk as at present, the cost of transport of which so greatly increases the expense of the preserving process in certain countries, and he obtains by the use of the said new compounds the same or even better results at a greatly reduced cost.

Of the preservative properties of the substances which he proposes to use—the tar acids, such as carbolic, cresylic, and others of a similar group—there can be no question; but they have hitherto been comparatively inapplicable to pit timber owing to the cost of applying them. This is precisely the obstacle which Mr. Boulton seeks to remove. He separates the acids by the usual methods with alkalies; the mode of using them varies with circumstances. If he uses them in the form of a watery solution he would dissolve the tar acids in alkalies according to the well-known methods, and would convey them in the form of concentrated alkaline solutions or of solid powder or other dry or nearly dry condition to the place where they are to be used, where they would then be mixed with any suitable quantity of water, making the solution such as to contain by preference from 5 to 10 per cent. of the tar acids. This solution would be injected into the timber in the usual way, and would be found to possess excellent antiseptic properties; amongst others, that of coagulating the albumen of the wood. In some instances he would procure the tar acids by dissolving them from the bulk of the heavy oils by repeated washing with water, it being now recognised that the tar acids are to a considerable extent soluble in water. It should be explained that in some cases it might be considered desirable to subject the timber to an oily preparation, as well as to the solution of tar acids above named, in which case any ordinary oil, either animal, vegetable, or mineral, could be used, as the tar acids that are deficient in such oils would have been already imparted to the timber by means of the first process. For the purposes of this second injection advantage might be taken of the process patented by him in 1879 for the elimination of watery particles in the process of preserving timber By employing in this process an oil such as linseed oil or any similar oil that has no objectionable odour, it may be used with great advantage for the treatment of timber intended for house building or household purposes, where the ordinary creosoting process cannot be applied on account of the offensive odours given off by the creosote. Sometimes he extracts the tar acids by the use of alkalies as before, and then neutralises them by means of mineral acids by the methods which are also well known in the process of preparing carbolic, cresylic, and other acids. The tar acids so treated form an oily body or solution, and would be conveyed in a more or less concentrated form to the country or district where they are to be used, to be there mixed with any oil, animal, vegetable, or mineral, with which it might be desirable to associate them for the purpose of injecting the compound into the timber.

Naphthaline has usually been considered an objectionable ingredient with oil of tar, but Mr. Boulton considers it an excellent substance for the preservation of timber. He, therefore, separates this substance either by filtration or by pressing in hydraulic or other presses, or by both processes, and would forward the same in as concentrated a condition as possible to be mixed or dissolved in any oil, animal, vegetable, or mineral, either in conjunction with the tar acids or without them. There are certain substances contained in the heavier portions of coal tar which come over in distillation after a temperature of about 500° to 750° Fahr. is reached. These substances are as yet but imperfectly known, but both they and the heavier distillates themselves have been found by experience to possess special qualities of very great value in the preservation of timber. This heavier portion of the products of distillation of coal tar he, therefore, separates, and either mixes them at the place of preparation of the timber with other oils, either animal, vegetable, or mineral, or extracts from the heavier portions of the distillates the tar acids or neutral oils which they contain, and mixes them at the place of preparation of the timber. Another method of using the alkaline solution of tar acids which he employs consists in mixing them with solutions of chloride or sulphate of zinc, sulphate of copper, corrosive sublimate, or solutions of other metallic salts. It is well known that several of these solutions of metallic salts have been proved to be efficacious to a certain extent in the preservation of timber, but their

value as preservative agents is greatly increased by the addition to them of the tar acids.—*City, Aug. 26.* AMICA.

REPORT FROM CORNWALL.

Sept. 7.—The interest of the local mining world is being concentrated this week to an extent hitherto unprecedented upon the Polytechnic Exhibition at Falmouth (referred to in full detail elsewhere), and there is very little else on which to remark. Every effort has been made to secure entire success for the Jubilee meeting of that society, and they have proved all that could be anticipated. There never has been such a gathering in any one place in the West of mining men and mining authorities from every part of the mining districts, not only of Cornwall, but of the adjoining parts of Devon—from Tavistock to St. Just. Especially is this the case to-day, when the Miners' Association held their meeting on the Polytechnic premises, and the Mining Institute make Falmouth the scene of their annual excursion, thus bringing the current interests of all three organisations to one common centre—*tria juncta in uno.* Both practically and socially the results of this association cannot fail to be good.

The interest in this direction will not fail to be sustained next week. Contrary to the usual practice, the Polytechnic is to last over two weeks instead of one, and three of the extra days are to be devoted either wholly or in part to mining matters. On Monday next a meeting will be held at the hall under the presidency of Mr. Peter Watson, when a number of practical papers will be read and discussed, among them being:—Capt. R. H. Williams, "The Ventilation of Mines;" Capt. C. Thomas, "Tin Dressing;" Capt. Hosking, "Rock-boring Machinery;" Mr. M. Loam, "The Man-engine." Then on Wednesday there is to be a full trial of rock-drills and air compressors, the drills being driven by compressed air; while on the following day there will be an excursion to the Carn Brea mining district, including for those visitors who wish it a descent of Dolcoath; all this, too, ought to bring about some practically useful results.

REPORT FROM NORTH AND SOUTH STAFFORDSHIRE.

Sept. 7.—The Cannock Chase coalmasters have with the commencement of autumn lost no time in declaring their "winter prices." This means an advance of 1s. per ton on domestic sorts, and business is this week being conducted on this basis. Furnace and forge coal is less easy in price in the matter of future deliveries, the uncertainties attending the course which in the matter of wages the colliers may by-and-bye see fit to pursue, in accordance with the recommendation of the Manchester Conference, making vendors cautious. East of Dudley furnace coal is still quoted 10s. per ton; steam or locomotive coal, 8s.; best slack, 5s. to 4s. 6d.; ordinary, 4s.; and common sorts, 3s. 6d. per ton. Ironstone is in fair demand, and is worth from 3d. to 6d. per ton more than last week. Native pig makers give rather better reports as to demand. Prices for common sorts, however, keep low, ranging from 39s. to 42s. 6d. per ton. Part mine sorts vary from 50s. to 57s. 6d., and best from 65s. to 67s. 6d. nominal. Some Wolverhampton pigs are easy at 38s. delivered, while best Derbyshire and Lincolnshire pigs are 50s. delivered. In the manufactured iron trade the item of chief interest this week is that Messrs. E. T. Wright and Son, of the Monmoor Works, Wolverhampton, have again carried off the contract for a three years' supply of boiler plates to the Admiralty. Ordinary plates are 8*l.*, and boiler plates 8*l.* 10s. to 9*l.*

On Birmingham Exchange this afternoon, and on Wolverhampton 'Change yesterday, samples of tin-plates, sheets, bars, &c., were shown which had been rolled out of the soft steel made in this district by the basic process. The quality of the samples was pronounced excellent.

A meeting of the South Staffordshire Institute of Mining Engineers was held at Dudley, on Tuesday, when the President (Mr. W. Farnworth) said that the Council had that day visited Cannock Chase, and witnessed some experiments with the new lime process for getting coal. Mr. Sopwith, of the Cannock Chase Colliery, said the men in the employ of the patentee had been down the pit, and he had offered them the shallow seam to experiment upon. After the lime cartridges had been put in and the expansion had taken place some 40 or 45 tons of coal had come down in a solid block. So far the trials had been as successful as they could desire. The cost of drilling, &c., would have to be carefully worked out in reference to gunpowder. The coal was dislodged so quietly that the only slack would be that made in breaking up the coal for the tubs.

The first of a series of meetings of miners of North Staffordshire, as a sequel to the Manchester Conference, was held on Monday at Harley. The principal speakers were Messrs. T. Bowen (Chairman), W. Brown, and W. Owen, who all urged the miners of the district to unite if they would gain the increase of wages "they so much desired and deserved."

The directors of Muntz's Metal Company at their meeting on Monday, resolved to declare an interim dividend at the rate of 10 per cent. per annum out of the ascertained profits of the six months ending June 30.

Mr. Frank James, the Chairman of the South Staffordshire Waterworks Company, has joined the board of the Staffordshire Joint-Stock Bank, filling the vacancy caused by the retirement of Mr. R. K. Hanbury.

TRADE IN SOUTH WALES.

Sept. 7.—A return just published shows that in South Wales and Monmouthshire there were raised in 1881 no less than 22,207,176 tons of coal. The Great Western Railway carried away 8,764,023 tons, of which 3,012,200 were conveyed from the Monmouthshire area. The London and North-Western carried 1,114,112 tons, 907,061 being carried to stations on their own system, and 207,051 tons to other companies' lines. The Midland Railway carried from South Wales 680,007 tons, and the Great Northern 26,655 tons, received from another railway. The Taff Vale Railway in 1881 carried in various directions 7,278,617 tons, compared with 8,894,403 tons in 1880. The details of distribution are:—To Cardiff and Penarth Junction, 6,298,818 tons, against 5,955,457 in 1880; sold retail 415,805 tons, against 365,691; to Quaker's Yard Junction, 143,428 tons, against 135,419; to Mountain Ash Junction, 2130 tons, against 4006; conveyed over by other railways 331,535 tons, against 345,757; to Brecon and Merthyr Junction 86,391 tons, against 97,010; to Walnut Tree Bridge Junction 510 tons, against 63. Of the shipments of coal, coke, and patent fuel 2,705,688 tons were sent coastwise from Welsh ports; 7,839,383 tons, of the value of 3,827,303*l.*, being sent to foreign countries.

In 1871, ten years previously, the amount raised in South Wales was only 10,131,720 tons. These returns show a greater expansion of trade than in any other mining district of the country in the same period. There are now 289 collieries in Glamorganshire alone, and new seams are being struck every now and then. Some time ago there was a discovery of a 6-ft. seam of coal at the new Coegnant Pit, sunk by the Llynvi and Tondu Coal and Iron Company in the upper part of Maesteg. Last week the 9-ft. seam was struck at the same pit. Since the sinking operations commenced, some months ago, three very valuable and workable seams of coal have been discovered, and when this colliery is opened up it is expected that employment will be given to from 800 to 1000 colliers.

These constant discoveries of new seams of coal tend to upset all calculations as to the exhaustion of the Welsh coal fields. The supply of men is more likely to fail than the supply of coal. There is work now for all who are willing to work, but disputes are constantly occurring, which tend to unhinge matters, and make proprietors doubtful about their contracts. The amount sent from Cardiff to foreign ports last week was 117,032 tons; Newport, 12,799 tons foreign and 18,688 coastwise; Swansea, 12,340 tons foreign and 8836 coastwise. The Alta-Italian Railway contract has just been secured by two Cardiff houses—one for 30,000 tons of large coal, and the other for 20,000 tons of small coal. The price of good colliery screened is 11s. per ton.

The principal event of the week in connection with the steel trade of the district has been the strike at the Landore Works, where about 1500 men have been thrown out in consequence of the refusal of the hammermen to accept a reduction varying from 25 to 33 per cent. These men now receive the high wages of from 5*l.* 10s. to 6*l.* per week, which is much higher than in other works of the same description, and the firm find that they cannot maintain their reputation in the markets of the world and give such high wages. The men are willing to concede 15 per cent., but will not submit to the large reduction demanded. It is expected, however, that before these lines are in print 100 hammermen at the old works will have gone in. The metalmen receive about 3*l.* 10s. per week, and they also will have to submit to a reduction. About 3000*l.* per week have been paid to 1500 men at these works, averaging 2*l.* per man. About 2478 tons of iron have been sent away from Cardiff during the week, and 1070 tons of Bilbao ore have come in. At Newport 1283 tons have been sent away to Lisbon and New Orleans, while the large quantity of 15,559 tons of ore have been received from Bilbao; iron ore and pyrites amounting to 5920 tons have been received at the same port from Carthagena, Santander, Porman and Huelva.

The tinplate trade is healthy as far as the works which are now open are concerned. Good coke-made plates fetch from 16s. 9d. to 17s. per box, and charcoal-mades from 19s. 6d. to 20s. per box. Spelter and zinc works are fully employed.

REPORT FROM NORTH WALES, SALOP, AND CARDIGAN.

Sept. 7.—The report of the Cambrian Railway Company just issued shows good results following the reduction made some time ago in second-class fares. There has been a considerable increase of second-class passengers and in the receipts derived from them. The report shows an increase in traffic over the lines in all departments save that of minerals. The decrease in this respect seems to be due chiefly to the smaller amount of coal carried, and, to a slight extent, to the less activity and production of the Cardiganshire lead mines. Possibly also a portion of the slate traffic from Festiniog now finds its way over the London and North-Western Company's new railway *via* Bettws-y-Coed to Llandudno Junction. The slate trade continues active, and shipping from Portmadoc goes on briskly, but the revival in this trade has hardly as yet affected the smaller and less known quarries of Wales. Of lead mines there is but little special to be said just now. Perhaps the following glimpse of lead mining in Shropshire in the year 1796 will be interesting to your readers in that county:—There have been rather more than the usual number of accidents in collieries and quarries during the past week. The Bog Mine, which is the highest up the hill, is at present choked with water; the other two—the Hope and Snailbeach—are opened in the bank of schistus that reposes on the whin; the latter mine, which is the only one that I have descended, is worked to the depth of 180 yards. The matrix of the ore is crystallised quartz and carbonate of lime, both the rhomboidal and the dog-tooth spar; the rhomboidal is frequently covered with pyramidal quartz crystals, and the quartz itself is overspread in many specimens with iron pyrites and very minute needles of dog-tooth spar. The ore is:—I. Sulphuret of lead, both galena and steel ore, which latter contains silver. II. Carbonate of lead crystallised. III. Red lead ore. IV. Blende or black jack. The red lead was first discovered in these mines by Raspe, a German mineralogist. The Snailbeach red lead greatly resembles the pulverulent cinnabar ores, being entirely free from crystals; whether, however, it derives its colour from the iron, or is a native *minium*, I know not. The lead ore is reduced at Minsterley and other places near the mines, whence it is sent by land carriage to Shrewsbury; here it is shipped, together with the raw calamine, in the Severn barges and sent down to Bristol.

TRADE OF THE TYNE AND WEAR.

Sept. 6.—The demand for most kinds of coal continues steady and prices are firm, but there has been no great advance of late. The steam coal works continue, on the whole, to be well employed, and the price of this coal is firm. There is also a good demand for manufacturing coal at fair prices. The advance of 6d. per ton on house coal is well maintained, and the demand for the coal continues to improve as the season advances. There is a very active demand for Durham coke, and contracts for future delivery will only be made at increased rates. Additional coke ovens have been erected at Marley Hill and many other coke works in the county of late, in order to meet the great demand for this article both for export and inland consumption.

A strike has taken place at the Low Bitchburn Colliery in Durham. The masters demanded a reduction, which was awarded to them by arbitration, but the men have resisted the change, and came out without having given notice. The masters are now proceeding to prosecute the men for breach of contract.

The resolution arrived at on Saturday at the Miners' Conference in Manchester has caused some consternation. It appears that the meeting passed a resolution to the effect that an advance of wages to the miners generally in this county should be conceded on or before Oct. 1 next, and, failing this, that the works should be closed. This appears to be a wild resolution, and, if carried out, it would only lead to disaster and discomfiture. A general strike of this kind would soon lead to the dissipation of the funds now held by the various Unions; and as the strike would not be against the masters, but against the general public for higher prices, the miners could not expect the general public to support them. The Durham delegates opposed this motion, and proposed an amendment in favour of a regulation of labour, with a view, no doubt, to a reduction of the output of coal. This course would certainly have been preferable to the one decided upon by a majority of the Conference, and we doubt very much that the miners of this great district will aid in carrying out the resolution. The price of the best coal produced in Durham and Northumberland is certainly small, and wages are consequently low; and it appears to be very probable that if the masters and miners agreed to reduce the output by, say, one day per week, the result might be beneficial to both parties. No doubt it would be an experiment; but such a policy could be easily revised if found to be a failure. Messrs. Pyman and Son, of Hartlepool, have purchased the Castle Eden Colliery, and the works have been transferred from Messrs. Lambton, bankers, to the above firm.

The iron trade is placed in a favourable position by the shipments this month, which amount to 95,861 tons. A slight fall of prices has, however, occurred among middlemen, owing to the announcement that the Scotch ironmasters have refused to continue the restriction of the make in conjunction with the Cleveland ironmasters. The makers, however, remain pretty firm, and consequently prices have not fallen much. Ship-plates are 6*l.* 15s.; bars, 6*l.* 2s. 6d.; puddled bars, 4*l.* 2s. 6d. The bar trade is rather sluggish compared with some other branches of the trade. The prices of pig-iron are 44s. No. 3. There is not much importance attached to the refusal of the Scotch masters to continue the agreement with the Cleveland masters as to restriction; the latter will, there is little doubt, continue in pretty nearly the same course they have followed the past few months. The reduction in the make of ordinary pig-iron in Durham and Cleveland has had a beneficial effect, as the masters have secured from 4s. to 6s. per ton advance. No doubt the position of this great iron-producing district is peculiar, and few other iron-making districts could have taken this course with advantage.

The North-East Coast Exhibition is opened this day (Wednesday). A wonderful transformation has been made in the appearance of the winter garden at the Aquarium, where the Exhibition is held. One of the decorations which has been placed in this part of the building is a magnificent trophy erected at the south end of the winter garden by Messrs. Wigham, Richardson, and Co., the eminent ship and marine engine builders of Walker, and will surmount their exhibits, while above another fine collection of exhibits will be found the models, pictures, &c., from the Trinity House, Newcastle. The models from the Admiralty and also from the Trinity House, London, are also placed in good positions. In the machinery department there is a pair of beautiful engines constructed by Messrs. Hawthorn and Co., Newcastle, for H.M.S. Dolphin, which are worthy of especial notice. Various steam dredgers have been erected on the sands. The Tyne Commissioners exhibit a diving bell, and it is worked by a silent gas-engine constructed by Clayton and Co., of Bradford, the agent for this company in the North being Mr. J. A. G. Ross, engineer. The exhibition of engines, boilers, &c., is very extensive and interesting, and there is no doubt whatever that the exhibition of marine architecture and engines has never been equalled, either for variety, number, or interest in any exhibition hitherto held in England; indeed, it is not merely a local but a national one We shall give a detailed description of the various exhibits next week.

IRON PYRITES.

In an interesting paper read before the Liverpool Geological Association, and now printed in pamphlet form, Mr. H. T. MANNINGTON treated first of the chemical and physical characters of the mineral; and, secondly, of its mode of occurrence, also making some slight reference to its commercial importance. He remarked that the physical characters are sufficiently distinct, as a rule, to distinguish it from other minerals without resort to chemical tests. It is from one of these that the name is derived—its hardness, which is from 6 to 6·5—between felspar and quartz. The word pyrites is generally stated to be derived from the Greek "pur" (fire) owing to the fact that sparks could be obtained by striking pieces of the mineral together or with steel. Pliny mentions several substances as included under the name, of which Dana gives four, one of which, described as a kind resembling brass or copper, was probably our iron pyrites, although then, as is very often the case now, copper pyrites was frequently confounded with it. The simple test of hardness will usually serve to distinguish it at once from its softer relative, iron pyrites resisting a knife, copper pyrites yielding to it easily.

The mineral is rarely, if ever, met with as pure bisulphide of iron, the metals copper, arsenic, lead, zinc, antimony, tin, nickel, cobalt, manganese, gold, silver, thallium, tellurium, selenium, indium, and possibly others have been found. Gold is usually disseminated invisibly through the mass, the pyrites being occasionally worked for it. Auriferous pyrites is frequently found in gold regions, it being common at the mines of Colorado and at many in California. Copper occurs frequently, replacing iron or existing as copper pyrites, and also thallium, which was discovered by Crookes in the dust of the flue leading from a pyrites kiln. The pyrites of the Rammelsberg Mine, in Germany, is especially rich in it, and a curious case of its occurrence is that in the furnaces of the Bethlehem Ironworks, Pennsylvania, where it is attributed to the pyrites of the coal used from the same State. Arsenic is common, appearing frequently to occur associated with copper. In the ores of commerce it is usually found that if an ore be rich in copper it is also proportionately high in arsenic. Schnabel found 0·17 per cent. nickel in pyrites from Eckerhagen, and Dana describes a nickeliferous variety from Gouverneur, New York, which was similar in composition, pale bronze in colour, and of radiate structure. He also mentions some specimens from Pennsylvania which contained 2 per cent. cobalt, and showed some crystal planes known in cobaltite, but not before met with in pyrites. A cobaltiferous variety is found in Canada at Brockville and some other places.

Lead in form of galena is of frequent occurrence, and silver also in small quantity probably associated with it, and in reference to this Mr. Mannington mentions some experiments described by Meunier on the reduction of metallic solutions by sulphides; he mentions galena, which reduces both silver and gold from solution, besides which he obtained precipitations with iron pyrites, copper pyrites, blende, and cinnabar. He thinks that this reducing action may sometimes account for the diffused presence of silver in galena, it having precipitated it from solution (*e.g.*, from sea water), which is said to contain traces of that metal. Specimen of pyrites shown crusted over with metallic silver resulting from immersion for a few hours in nitrate of silver solution. A stanniferous variety (Ballasterosito), and containing tin and zinc, occurs in Galicia.

Turning to the consideration of the modes of occurrence of pyrites and marcasite, Mr. Mannington remarked that iron pyrites is stated to be slowly decomposed by water and air, with the aid of a certain amount of heat, with the resulting formation of hydrous oxide of iron and sulphuretted hydrogen; this reaction may possibly have been concerned in the production of the large deposits of gossan found above the masses of pyrites in various countries, although the chief cause is no doubt slow oxidation and formation of sulphuric acid. Shales and clays are frequent depositaries of iron pyrites, it being in sedimentary strata or in conjunction with them that it chiefly occurs. According to Méné (quoted by Lunge) the pyrites from volcanic formations contain no water, that from sedimentary strata both water and clay. There sometimes occurs amongst pyrites a variety which detonates violently when thrown into a fire or kiln; this peculiarity is supposed by Lunge to arise from zeolites present in the ore, but if so it is usually not apparent exteriorily; this occurs also frequently in coal pyrites, but I am disposed to think from the presence of occluded water, which may also be the cause in the other case. Large amounts of copperas or sulphate of iron are produced by the oxidation of the pyrites in shale, generally of the coal measures, which is exposed to the air, and the resulting copperas dissolved out of water and crystallised. Lunge states that in 1874 10,000 tons of pyrites picked from coal was utilised in this country, most of it probably in this manner. At various collieries the shale is thrown into heaps, upon which the rain falling dissolves out the sulphate of iron resulting from slow oxidation of the pyrites, which solution is evaporated and crystallised.

In the United Kingdom the chief deposits occur in County Wicklow, where the pyrites is found in beds from 5 ft. to 50 ft. in thickness, which overlay silicious clay-slate, and to which I shall again refer. In England it occurs in Cornwall and Devonshire, containing 25 to 35 per cent. of sulphur and some arsenic; during the year 1880 5188 tons were obtained from these counties. In North Wales there is a mine at Trefriw where the ore (containing about 40 per cent. of sulphur) occurs in Lower Silurian rock, and in contact with a dyke of greenstone, the junction between the lode and the adjoining rock is frequently clearly marked The quantity produced is some few thousand tons per annum. The great deposits of pyrites, however—those of the greatest importance industrially—occur in a tract of country at the southern part of the Spanish Peninsula, where the ore occurs in large lenticular masses or lodes, and where the supply appears practically inexhaustible. There are various deposits, some of considerable extent, at Vermont, Missouri, Lake Superior, &c., and also in Canada, but about these he was unable to obtain very precise information. The ores may be separated into cupreous and non-cupreous, but for the present purpose we need not do so, as the bulk of the pyrites which is used commercially is of the cupreous variety, probably somewhat more than two-thirds, although frequently not containing more than 2 per cent. of copper.

Iron pyrites is not primarily used as an ore of iron (an invention for utilising pyrites residuum for the manufacture of steel is amongst recent patents), but of sulphur, and it is from it that the great bulk of the sulphuric acid of commerce is produced. Before 1838 sulphur had been exclusively used for the manufacture of this acid, but in that year the price was nearly trebled owing to a monopoly granted by the King of Naples; this led manufacturers to turn their attention to other sources of sulphur, and the use of pyrites so rapidly extended that in less than 40 years afterwards (1874) no less than half a million tons were imported into Great Britain for the purpose of this manufacture. Details concerning it are unnecessary, but he says that the ore is broken into small pieces, burnt in kilns, and the resulting sulphurous acid gas passed into leaden chambers, where, with the aid of steam, &c., it condenses as sulphuric acid. After yielding its sulphur in the form of sulphuric acid, the cupreous pyrites cinders are generally treated for the extraction of copper, previous to which, however, the silver, to the amount of about 18 dwts. per ton, and also a small amount of gold is extracted by what is known as Claudet's method, by which it appeared on treating a large quantity of burnt ore at a Widnes works that 0·65 ozs. silver and 3 grs. of gold per ton might be extracted from Spanish pyrites, and with considerable profit. After these metals have been removed there remains only the oxide of iron, with some silica, &c., and this is finally worked up for the making of iron and the lining of iron furnaces, so that there is not much of the original ore left to be utilised.

SWEDISH IRON DEPOSITS.

The recent grant by the Town Council of Lulea, in Sweden, of a considerable sum of money towards the construction of the Gellivara Railway again brings the famous iron deposits in the North of Sweden, which are, without doubt, the largest iron beds in the world, under public notice. They are four in number—Gellivara iron mountain, in Lulea. Lappmark, which is situated about 100 miles from the Gulf of Bothnia, and was discovered in 1704, when the privilege of inmutning was granted to a lieutenant in the Swedish army; from that time a small quantity of ore was extracted, and carried on reindeer to the coast, every animal carrying about 3 cwts.; but although any considerable quantity could not, of course, be brought down in this way two works and three furnaces were, however, kept going. The iron deposits in the North of Sweden have on several occasions attracted public, as well as private, attention, and have consequently been several times prospected and reported upon. We thus find that in the year 1817 a Royal Commission was dispatched to these tracts in order to ascertain the state of the mines here, the quality and nature of the ores, &c., and in 1862 the English company, to whom the Gellivara mountain then belonged, sent the distinguished geologist, Prof. Erdman, to report upon this deposit; but as no prospect had given any reliable or definite information, either of the composition of the ores or the quantities obtainable from the beds, the King of Sweden, Oscar II., decided upon sending a Commission in the summer of 1875 to the parishes of Gellivara and Jukkasjäroi to ascertain the state of the mining industry in these districts, and the probable supply of ore obtainable, with a view to the construction of a railway between the Gellivara mountain and the town of Lulea—the principal port on the Gulf of Bothnia. This Commission, which consisted chiefly of members of the Royal Geological Association in Stockholm, tendered a report, from which we learn that the Gellivara deposit is a mountain ridge, consisting of gneiss with a longitudinal extension of about 6000 yards, and through which the strata of metalliferous ore run. The total cubic contents of the deposit is stated to be 148 million cubic feet, of which 1-20th or some 7½ million cubic feet are estimated to be metalliferous mountain, and it has been calculated that the breaking out of a foot of surface of the metalliferous mountain would yield nearly one million tons of iron ore, or a third more than the entire output last year from the Swedish mines. The iron forming the deposit is of two kinds—magnetic, commonly called black ore, and hematite or bloodstone—the latter being found in streaks in the former without any distinct outline, the magnetic iron containing apatite and sulphur. In the crucible the richest ore has yielded 70, and in some instances even 74, per cent. of pig-iron, and the poorer 60 to 70—none which have been subject to analysis less than 50 per cent. The greatest quantity of phosphorus found in the ore has been 1·72 per cent., and the smallest 0·01 per cent., and although the appearance of the hematite ore would make it probable that this kind contained less apatite than the black ore it has been ascertained not to be the case, whilst the sulphur contents have been found to be very small—thus the standard analyses of the Commission show the greatest quantity to have been 0 18; generally, however, only 0·05 per cent., and in some cases no trace of the mineral was found. The manganese content of the ore is also very small—only about 0·15 per cent. oxide, and the quantity of titan contained from 0·45 to 1·91 per cent. oxide. As the Bessemer process of manufacturing steel requires for producing a metal of good quality ores, which do not contain more than 0·05 per cent. of phosphorus and the Swedish method of "Lärdfärsking" requires for producing bar-iron of irreproachable quality ores containing not more than 0·10 per cent. of the mineral, it is apparent that the Gellivara ore is useless for either purpose, but may, however, be found excellent for puddling and casting. It has also been calculated that 1-7th or about a million cubic feet of the ores in these deposits may not contain more phosphorus than necessary for making them of any use for the manufacture of Bessemer steel, whilst the breaking out of a foot of the Gellivara mountain would yield about 130,000 tons of such ores.

Junosuvando iron mountain was discovered in the year 1640, and is situated in Tornea, near the Russian frontier. The iron found here contains 60 to 70 per cent. magnetic iron, of dark-blue character, which is deposited in layers of chalk, chloride, and felspar, and is slightly mixed with copper. The deposit has been worked from time to time, and four furnaces were once in blast here; but, owing to the want of communication and the absence of population, the work soon ceased, and the concern has not since risen to any prominence. Kirunavara iron deposit is formed by some peaks of iron-containing mountain, having a longitudinal extension of about 14,000 ft., with an area of 3,526,000 ft., and the iron ore found here is manganese or black ore, occasionally mixed with hematite, while the gangue is porphyry, both grey and red. The ore contains a certain amount of apatite, but rarely any trace of sulphate of iron. Of the 28 standard analyses which have been made 12 yielded from 70 to 73½ per cent. of pig-iron, 13 from 65 to 70 per cent., and only three less—the lowest yield being 61·5 per cent. The quantity of phosphorus contained in the ore was, however, very large, as most of the samples analysed contained from 0·03 to 2·80 per cent. of this mineral, four only containing as little as 0·03 to 0·05 per cent., and these specimens were taken from both extremities of the deposit—the quantity of sulphur found varied from 0·03 to 0·15 per cent. By a very careful and clever calculation made by Prof. Carlberg, of Stockholm, we find that this mountain is estimated to contain from 15 to 16 million tons of iron ores of the kinds described above.

Luosavara iron mountain is situated near the above mentioned, and the longitudinal extension of this iron bed is about 4500 feet, with a width of 155 feet, and a content of about 560,000 cubic feet; the ore is similar to that found at Kirunavara, but is nearly free from apatite. Of eight standard analyses of this ore five yielded from 70 to 73 per cent. pig-iron, three from 67·4 to 69 per cent; but the quantity of phosphorus is, on the other hand, very small—in two samples it was found to be 0·01 per cent., and in a few others it varied from 0·02 to 0 08 per cent. The content of sulphur has varied from 0·03 to 0·90 per cent., and of manganese it was found to be about 0·15 per cent. of manganese oxide. The quantity of titan varies according to analysis from 0·94 to 1·09 per cent. The whole of this deposit contains thus iron ore of excellent quality, and it has on this authority quoted above been estimated to contain from top to base nearly 27 million tons of ore, besides what may exist under its base.

Svappavara mountain contains copper as well as iron lodes, both metals being deposited in a gangue of grey schistose and quartz. The iron deposits forming the highest part of the mountain extend some 2100 ft. in length, from 180 to 330 ft. in width, embracing an area of about 424,000 feet; the ore found here is partly black ore, and partly bloodstone, and contains a great deal of apatite, but very little sulphate of copper. In the crucible the black ore has yielded from 64 to 69·5 per cent. of pig-iron, and the bloodstone from 50·5 to 58 per cent. The quantity of phosphorus which the ore contains is, however, very great; the black ore, for instance, from 0·95 to 1·46 per cent., but of manganese or titan it has been found to contain few traces. The ridge of the mountain contains the greatest iron formation, calculated at about six million tons of ore.

Beyond the four deposits we have thus described none discovered in Lapland are of any importance. Several attempts have naturally been made of late years in Sweden to open up a communication with these enormous deposits, and throw them open to enterprise; but these have for reasons we shall show hitherto failed. Thus, a company called the Gellivara Company was formed some 15 years ago, and supplied with English capital, attempted the construction of a canal through the rivers in Lapland; but, after great expenditure and no returns it went into liquidation, out of which the New Gellivara Company arose, with a fresh capital of half a million sterling, provided chiefly by Mr. Giles Loder, of London and Riga, and after several attempts to obtain the concession for a railway and a contribution towards its construction from the Swedish Government the company never succeeded in its object, and has during the last few weeks been reconstructed as a Swedish company, in order, it is supposed, under this disguise to obtain what has been refused before. It would in any case be a question of great doubt whether such a railway through a depopulated and poor country, supported only by the receipts for iron ore and timber would ever be a financial success. There was last year introduced to the Swedish Diet a Bill for the construction of such a railway, but it was defeated by a considerable majority. It might appear a matter of some surprise to many that a country possessing such riches in the shape of these enormous iron deposits should not desire them utilised and thrown open to enterprising investors; but the fact is that the iron manufacturers in the south and central part of Sweden, whose views are shared by the Government, do not desire to have the iron market of the world with a limited consumption, swamped with Swedish iron. They argue, and with great justice, that any demand for this article which may be made from abroad they will be fully able to respond to; in fact, if three times as much Swedish iron should be required abroad they would be in a position to supply it, and in this circumstance lies the whole secret of the failures of the undertakings.

We may in conclusion mention that a different attempt to connect these deposits with a railway was made last year by some Belgian speculators, but their object was to construct such a railway through Norway. They would here meet fewer obstacles, and have the immense advantage of a seaport open all the year round, which the Baltic is not. A party of Belgian engineers was, therefore, dispatched last summer to the North of Norway to prospect on this railway, and it was proposed by them to run a line from the bottom of the Ofotenfjord (lat. 68·30°) to the Swedish village of Jukkasjäroi (lat. 68°) mentioned before, (ultimately to Haparanda, on the Gulf of Bothnia, and from thence to St. Petersburg) some 90 miles, of which 20 would run through the Norwegian kingdom, its maximum gradient would be 1 in 90 to 1 in 80, and its cost was roughly estimated at 70,000*l.* The suggestion was, of course, received very favourably by the Norwegian Government, Norway sharing nothing but the advantages of such an undertaking; but unfortunately the Swedish Government refused to grant a concession as far as they were concerned. But as we see from the large subscription recently made by the Town Council of Lulea, the head-quarters of the Gellivara concern, the undertaking which we have sketched above, and which may in time affect the world's supply of iron to a great extent, is not buried; in fact the people in the North of Sweden are as sanguine as ever of the golden age which shall dawn upon them through this railway and its consequences.

FOREIGN MINING AND METALLURGY.

The Belgian coal trade continues to present a good tone. Coal has been in considerable demand, while on the other hand labour has begun to be a little scarce, especially in certain districts in the Charleroi basin. The North of France has carried off of late a rather considerable number of working miners from Belgium. Coal quotations have not varied materially upon the Belgian markets during the week, important deliveries having been made at former rates. The general aspect of the German coal market is encouraging. Orders have come freely to hand, and the production has been readily disposed of. Industrial coal has been especially sought after. It is remarked that inferior descriptions have been somewhat neglected. The home coal consumption of Germany is important, and the deliveries have presented considerable activity. During the first half of August an average of 7002 trucks was dispatched daily over the railways accommodating the basin of the Ruhr. The corresponding daily number for the corresponding half of July was 7123 trucks, but if we go back to the first half of August, 1881, we find a daily average of only 6153 trucks. The deliveries of German coal to foreign markets have also been important—to Holland and France on the one hand, and to Russia and Austria on the other. Quotations have scarcely varied, although the demand for coke is so extremely well sustained that producers show a disposition to advance their rates to some little extent. The Paris coal market has been quiet, but business will, no doubt, soon exhibit a certain amount of activity. It is not yet known whether the demand for coal for the French sugar-works will be on a considerable scale this year, as uncertainty yet prevails as to the sugar beet crop.

There is scarcely any change to report in the general tone of the Belgian iron trade, business having still been characterised by firmness. We may sum matters up by saying that employment is general, and that orders do not make default, although there is nevertheless an impression that current circumstances do not justify an advance in rates. Pig has been maintained upon the Belgian markets on about former terms. English casting pig has brought about 2*l.* 12s. per ton, while Belgian pig has been scarce and in request at 3*l.* per ton. The production of the Belgian blast-furnaces is now almost fully engaged until the end of the year. Refining pig has remained at about former rates in Belgium. No change can be reported in iron. No. 1 has been quoted at 5*l.* 8s. to 5*l.* 10s. per ton, while No. 2 has made 5*l.* 16s., and No. 3 6*l.* 4s. per ton. Girders have been in request of late on English account, contracts having been concluded to the extent of from 2000 to 3000 tons. A quotation of 5*l.* 16s. per ton has been maintained with much firmness. Plates have been in considerable demand in Belgium. Business in good marks No. 2 could not be done below 7*l.* 12s. per ton both at Liège and Charleroi. Boiler-plates have been in demand at 8*l.* 8s. per ton. The rolling mills are generally well employed, and several of them could not accept orders unless they were allowed a minimum period of three months in which to make deliveries.

Prices have shown little change upon the Paris iron market. Transactions have continued numerous and important, and this has enabled the forgemasters of the Nord to maintain their terms. Merchants' iron has brought 8*l.* per ton at Paris. Pig has been also well maintained. In the Nancy group prices are beginning to be discussed in connection with the renewal of contracts; some of the contracts are, it is stated, already signed upon a basis price of 2*l.* 16s. per ton. There are now 19 furnaces in blast in the Longwy group, while six furnaces are in course of construction. Old iron has been in considerable request. The Northern of France Railway Company recently sold 700 tons of old rails at 5*l.* 1s. 3d. per ton, and 350 tons of old rails at 5*l.* 0s. 5d. per ton. The same company recently offered 3000 tons of old rails in three lots, which were taken by the St. Dizier Forges and Workshops Company at 4*l.* 19s. 5d. per ton, 5*l.* 0s. 5d. per ton, and 5*l.* 1s. 3d. per ton respectively. The general tendency of business in the German iron trade continues favourable, and there is some expectation that an advance will be shortly established in quotations. Pig has been in great request, and the proprietors of several blast-furnaces show a reluctance to enter into further contracts in advance, as they hope and expect to see a rise in price before the close of the season. The rolling-mills cannot meet the demands made upon their resources, although working to their utmost strength; they also find difficulty in procuring raw material. Bars have been in request upon the German markets, and have shown an upward tendency; the same may be said of rails, girders, and plates.

IMPROVED SECONDARY BATTERY.—The electrolytic formation of secondary cells or elements from pure zinc vitriol, and also the general arrangement of the thin lead plates coated with oxide of lead and placed opposite the zinc plates, whereby great electromotive force and considerable quantities of electricity are attainable by elements of small weight, is claimed by Dr. EMIL BOTTCHER, of Leipzig. A solution of pure sulphate of zinc (1 part of sulphate to 3 parts of water) is decomposed by a current from a dynamo-electric machine, and thereby zinc deposited on a cathode or plate of very thin sheet zinc. The liberated sulphuric acid in a state of dilution employed (1 part of acid to 10 parts of water) does not attack the pure zinc, as shown by experience. As an anode he uses thin lead foil (about 0·05 millimetres (which has been previously prepared by folding it lengthwise from top to bottom in order to increase the active surface, dipping it into an aqueous emulsion of pure litharge (lithargyrum laevigatum) prepared with the above zinc solution, and coating it with a thick layer of the said emulsion. The oxygen coming in contact with the anode or lead-plate forms on its surface an exceedingly thin layer of peroxide. By closing the galvanic element or cell formed as described the previously deposited zinc is re-dissolved and the original sulphate of zinc produced, while the hydrogen reduces into finely divided metallic lead not only the peroxide formed on the lead-plate, but also a zone or layer of the oxide of lead coating. By a new regenerative current zinc is again deposited on the zinc-plate, while on the anode the recently reduced lead is oxidised into peroxide of lead. A few repetitions of the process ("forming" process) render the secondary element ready for use. It has the high electromotive force of 2·2 Daniells, but can be already practically utilised after the first decomposition with an electro-motive force of only 0·5 Daniell. The strength of current stored in the cell can be completely recovered. Owing to the material employed and the application of very thin plates the element or cell can be constructed very light and at a low cost.

Registration of New Companies.

The following joint-stoccompanies have been duly registered —

THE FLEETWOOD PIONEER STEAM SHIPPING COMPANY (Limited).—Capital 20,000*l.*, in shares of 10*l.* To purchase and carry on a shipowner's business. The subscribers (who take one share each) are—W. Poole, Fleetwood; G. Beckes, Fleetwood; W. Gundle, Fleetwood; T. Clark, Fleetwood; J. Gusty, Fleetwood; S. Lewthwark, Fleetwood; F. M. Arnold, Fleetwood.

THE BRAGANZA MINING COMPANY (Limited).—Capital 65,000*l.*, in shares of 10*l.* The acquisition of mines, minerals, land, material, plant, chattels, &c., comprised in a certain agreement made between the Mineral Proprieties Association (Limited) of the one part and the Braganza Mining Company (Limited) of the other, and to acquire any other lands, mining properties, rights, and privileges, &c., for the purpose of carrying on the various operations connected with mining in all branches. The subscribers (who take one share each) are—F. O. Bennett, West Dulwich, accountant; J. S. Griesbach, 39, Camden-road, no occupation; W. Gow, Junior Carlton Club, no occupation; J. Milne, 11, Queen Victoria-street, accountant; E. Sabel, Burnt Ash-lane, merchant; J. T. Johnson, Woodford, C.E; J. A. Mays, 9, Great Winchester-street, no occupation. The following gentlemen are to be the first directors:—Sir W. Smith, Bart., J. Wiseman, W. M'Candlish, and W. M. St. Aubyn, M.P., with power to add to their number.

THE NATAL SHIPPING COMPANY (Limited).—Capital 60,000*l.*, in shares of 10*l.* A shipowners' business in all its branches. The subscribers (who take one share each) are—T. P. James, 21, Ryder-street; J. T. Hitchins, Falmouth; F. J. Merriclees, 31, Hertford-street; R. B. Mackie, Wakefield; R. Cockerton, 83, Cornwall Gardens; J. Napier, 23, Portman-square; J. C. Bolton, Carbrook, M.P.

THE TEXAS LAND AND MORTGAGE COMPANY (Limited).—Capital 500,000*l.*, in shares of 10*l.* A land and mortgage business in all branches. The subscribers (who take one share each) are—Sir A. Burnett, Aberdeen; J. B. Nicholson, Fordown; J. Mestow, Aberdeen; A. G. Renshaw, 2, Suffolk-lane; G. S. Coxon, 55, St. Charles'-square; R. Pinking, 18, Broad-street; J. C. Mounsey, 7, Laurence Pountney-lane.

THE HOWATSON PATENT FURNACE COMPANY (Limited).—Capital 100,000*l.*, in shares of 5*l.* To purchase, manufacture, and sell apparatus and appliances for the consumption or abatement of smoke, in conjunction with certain patents. The subscribers (who take one share each) are—T. D.'O. Orzechowski, Paris; O. C. de Gerson, 1, Pall Mall-place; F. Anderson, 1, Suffolk-lane; J. D. Gibbs, Paris; W. H. Adams, 30, Peckham-grove; E. S. Hooper, 8, Saltairn-crescent; S. R. Hurst, Camberwell.

THE SOUTH STAFFORDSHIRE ELECTRIC LIGHTING COMPANY (Limited).—Capital 100,000*l.*, in shares of 5*l.* The business of electricians and mechanical engineers in all branches. The subscribers (who take one share each) are—F. Williams, Wednesbury; T. Underhill, West Bromwich; R. Mills, Darlaston; T. Smith, Wednesbury; E. Horton, Darlaston; J. C. Tildesley, Willenhall; J. Harper, Bilston; E. H. Carter, Birmingham; E. Pritchard, Birmingham; J. Jolly, Tipton.

THE LIVERPOOL UNION BANK is incorporated as a limited liability company.

THE UNITED KINGDOM CREDIT CORPORATION (Limited).—Capital 100,000*l.*, in shares of 2*l.* The business of discounters, money scriveners, and agents, &c. The subscribers (who take one share each) are—R. McKenzie, 5, Walterton-road; C. J. Jones, 2, Storey's-gate; W. B. Campbell, Anerley; D. C. Laughton, 94, Pethertonroad; W. C. N. Shore, 1, James-street; J. J. Lowry, Brixton; J. H. Outhwaite, Brighton.

THE CORNWALL TRADING COMPANY (Limited).—Capital 25,000*l.*, in shares of 1*l.* To purchase and undertake the business of the Roche Trading Company, in Roche and St. Austell, Cornwall. The subscribers (who take one share each) are—E. R. Mainear, Roche; W. J. North, Newquay; S. Kent, St. Stephen; J. Barratt, Truro; J. W. Cock, Roche; A. E. J. Tregay, Roche; N. Grose, Roche.

THE ORITA GOLD MINES (Limited).—Capital 20,000*l.*, in shares of 1*l.* To purchase or otherwise acquire lands, estates, mines, mineral grants, mining rights and privileges, ores, minerals, and other properties in South America or elsewhere, and to carry on the business of miners, smelters, crushers and reducers of ores and minerals, and manufacturers of products of same and the treatment thereof, and generally to carry on all operations connected with gold and other mining. The subscribers (who take one share each) are—A. Russell, 101, Cannon-street, secretary; H. W. Russell, Peckham, clerk; S. A. Cobbett, 1, Winchester House, secretary; W. L. Dunn, Upper Clapton, accountant; J. Doggett, Hampstead, bookkeeper; J. E. Hill, Winchmore Hill, clerk; A. W. Foot, Upton, clerk. The directors must not exceed seven or be less than three. The first are—A. Fowler, W. T. Hill, J. Romanes, and P. W. S. Ross; qualification of future directors 100 shares.

THE HEBDEN BRIDGE COTTON AND COMMERCIAL COMPANY (Limited).—Capital 30,000*l.*, in shares of 5*l.* To purchase the liabilities and carry on the business of a company in course of being wound-up voluntarily. The subscribers are—J. Jackson, Hebden, 12; J. Cheetham, Hebden, 56; J. U. Blackburn, Hebden, 12; R. Ashworth, Hebden, 10; H. Sutcliffe, Todmorton, 19; W. Dewhurst, Heptonstall, 10; J. Hollimake, Hepstonstall, 16.

THE NATIONAL UNION INVESTMENT COMPANY (Limited).—Capital 100,000*l.*, in shares of 1*l.* To carry on and transact all investments and other cognate business. The subscribers are—Sir E. H. Meredyth, Warnbrook, 80; S. J. C. Watson, Tulse Hill, 1; A. McCulloch, Chiswick, 1; G. M. Sheridan, West Brompton, 1; E. W. Knapp, 13, Moorgate-street, 50; J. H. Lamprey, East Dulwich, 50; T. Borras, Kilburn, 1.

THE STAFFORDSHIRE STEEL AND INGOT IRON COMPANY (Limited).—Capital 70,000*l.*, in shares of 10*l.* The business of steel and iron manufacturers, miners of iron, coal, and other metals and minerals, smelters, quarrymen, &c. The subscribers (who take one share each) are—A. Hickman, Wolverhampton; G. J. Barker, Wolverhampton; W. B. Harrison, Brownhill; P. C. Gilchrist, Palace Chambers; A. W. Hickman, Wolverhampton; T. Fisher, Birmingham; E. Riley, 2, City-road.

THE RUSSIAN PRODUCE COMPANY (Limited).—Capital 100,000*l.*, in shares of 5*l.* and 1*l.* To purchase, sell, deal in, and export cattle, sheep, and other live stock. The subscribers (who take one share each) are—E. A. Englefield, 99, Queen's Gate; E. E. Michell, Weybridge; A. L. Kew, Streatham; S. Schreider, Hanover; H. W. Weguelin, 57½, Old Broad-street; J. Eddowes, 57½, Old Broad-street; G. B. Bentham, 17, Sloane-street; A. Griffith, 3, Buckingham-street.

THE PEOPLE'S PALACE OF VARIETIES COMPANY (Limited).—Capital 10,000*l.*, in shares of 5*l.* each. To purchase the Prince of Wales's Concert Hall and Theatre at Wolverhampton, and provide theatrical and other entertainments. The subscribers (who take one share each) are—B. Horton, Birmingham; W. H. Anderson, Wolverhampton; W. Gibb, Wolverhampton; F. Wills, Wolverhampton; W. Bruford, Wolverhampton; T. Downes, Tipton; T. H. Hinde, Wolverhampton.

THE PYRITES SMELTING COMPANY (Limited).—Capital 6000*l.*, in shares of 10*l.* The business of traders in metals and smelters and reducers in all branches. The subscribers (who take one share each) are—H. P. Stone, Framfield; J. E. C. Koch, 107, Philbeach Gardens;

J. C. Nicholls, 50, Beresford-road; R. B. Smith, 5, Angel-court; E. C. Koch, 38, Threadneedle-street; A. H. Koch, 107, Philbeach Gardens; J. G. Cowan, 28, Fenchurch-street.

JOHN ATKINSON AND COMPANY (Limited).—Capital 25,000*l.*, in shares of 10*l.* To purchase and continue the business of a brewer, malster, hopmerchant, distiller, wine and spirit merchant, established at Bolton. The subscribers (who take one share each) are—W. Worsley, Farnworth; W. Heyes, Bolton; J. T. Atkinson, Bolton; J. McKitterick, Bolton; W. Lever, Bolton; J. Atkinson, Bolton, T. Gerrard, Bolton.

HISTORY OF COAL MINING IN GREAT BRITAIN.

Although the history of coal mining has many times been written there is such an extensive field for research as to ancient and early details concerning it that an author can always find something new and interesting to bring forward, whilst the important part which coal has played in the development of our industrial resources and in the creation of the commercial greatness we now enjoy will always ensure works of this class being attentively read, especially when, as in the carefully written little volume by the author of "The Steam-engine and its Inventors"—A History of Coal Mining in Great Britain. By ROBERT L. GALLOWAY. London: Macmillan and Co.—the direct connection is traced between the mineral and some of the most important inventions of modern times. Mr. Galloway remarks that railways, the steam-engine, and the locomotive were almost called into existence by mining requirements, and were long employed by the mining community before they came to be adopted in a more improved form by the public in general. Treating his subject in 23 chapters, he is enabled to keep each section of his subject distinct, and the many valuable facts he records can be readily referred to, and when necessary considered in connection with each other.

The imperfect record possessed of the early history of coal is acknowledged by Mr. Galloway although as he remarks in the early dawn of history Britain was already celebrated for its mineral productions. It is evident, he adds, that the employment of coal fuel to any extent is of comparatively very modern date. It seems clear that the Romans were not wholly unacquainted with it during their occupation of the country from the fact of small quantities of coal and coal ashes having been found among the ruins of many of their stations. It is not, however, until a period long subsequent to their departure that the mineral begins to appear among other commodities as an article of merchandise, and to be referred to in terms which are clear and unmistakable. In referring to the system of mining Mr. Galloway makes a statement which will require considerable evidence in support of it before it will be accepted—he thinks that the word "adit" is merely a contraction of "aqueduct"—since it has usually been asserted that it is derived from the third person singular of the Latin verb, which would indicate that the adit was made to go to the pit. Æneas Sylvius (afterwards Pope Pius II.), who visited Scotland as papal legate in the middle of the 15th century, appears to have given an equally accurate definition of coal since he mentioned in his Commentaries that he saw the poor people who begged at the churches, going away quite pleased with stones given them for alms. "This kind of stone," he adds, "being impregnated with sulphur or some fatty matter, is burnt instead of wood, of which the country is destitute." The chapter on the difficulties experienced in substituting coal for wood and charcoal in manufacturing processes, more especially in the smelting of iron is a very interesting one, and in that on noxious gases in mines it is remarked that during the middle ages phenomena connected with the atmosphere of mines, which were beyond the comprehension of miners, were usually ascribed to the supernatural agency of fairies and goblins, whose opposition was to be overcome by means of fasting and praying. Before the light of scientific investigation, however, these ignorant and superstitious notions began to give way. The subterranean spirits vanished into air, or rather became metamorphosed into noxious gases. The apparently altogether capricious phenomena were demonstrated to be occasioned by purely natural causes, and ventilation was found to produce a more effective exorcism than the methods previously adopted. At first choke-damp appears to have been the chief cause of difficulty, but in the early part of the 17th century fire-damp had already commenced to claim its victims, and as the 17th century advanced difficulties with fire-damp became great and general.

The inadequacy of the water-raising machinery was felt in the beginning of the 18th century, and in 1708 a plan was projected in Scotland for draining collieries by means of windmills and pumps; but so backward was the state of engineering art in the country that no person was known competent to put the scheme into execution except John Young, a millwright of Monrose, who had been sent to Holland at the expense of the town to inspect the machinery there, and it was suggested that if the services of this person could not be obtained, advice on the matter should be sought from the "Mechanical Priest of Lancashire." The Earl of Mar, Savery, Newcomen, and others afford plenty of matter for the history of the 18th century, and Mr. Galloway certainly furnishes many very readable chapters. Passing on to the present century, the 14th chapter will be found of especial interest, from its furnishing an account of the various systems of dealing with inflammable gas—the diluting system, the neutralising system, the firing system, and the draining system. Amongst the subsequent chapters are those treating of the extended use of the steam-engine, the locomotive, steam-boats, and the introduction of gas lighting; of the invention of cages and iron wire ropes; of mechanical ventilation, and so on; the concluding chapter dealing with modern mining, and measures against explosion, and the author very justly remarks that considering all the circumstances, it is, perhaps, too much to expect that the time will come when explosions in coal mines will entirely cease to occur; but the spread of education and intelligence, and the growth of facilities for obtaining a knowledge of the means best calculated to promote the safety of miners are sufficient to encourage the hope that in the future mining operations may be attended with less risk and loss of life than has hitherto been the case. The volume throughout is a condensation of all the more important records which exist in connection with the subjects referred to, and entitle the author to congratulations for excellent arrangement and careful selection of material.

NEW ROCK-DRILLING MACHINE.—The feet of the machine invented by Mr. JOSEPH L. MCCLUGHEN, of Ozark, U.S., are provided with rollers that can be swung under them to move the machine. The drill carrying frame is pivoted to an upright standard on the base frame, and can be turned to set the drill at any desired angle, and is held in position by a spring catch and segmental rack bar. The drill is raised and lowered by means of a crank and worm gear. In operation when the crank shaft is rotated a tappet raises the drill frame, which after the tappet passes is forced down by a spring, thus giving a rapid reciprocating motion to the drill, which is also turned as it reciprocates. A coil spring raises the drill off the rock when it strikes, and prevents the drill bit from catching in the sides of the cavity made by it.

MIXING CONCRETE.—The apparatus for mixing the materials used in the making of concrete more cheaply and without engine-power, according to the invention of Mr. JOHN JACKSON, of Kensington, consists of a main truck or shoot supported in a vertical or approximately vertical position open at its top, where it is provided with a hopper, and also open at its bottom, the bottom preferably tapering or inclining inwards towards the opening. The main trunk has in its interior shelves which incline downwards, and project alternately from opposite sides of the interior of the trunk, and are so situated relatively one with the other, that when the materials to be mixed are thrown into the hopper they fall down the first inclined shelf and therefrom on to the next inclined shelf and so on from shelf to shelf until they pass from the open bottom of the said main trunk or shoot into a truck or receptacle placed to receive them, the material being thoroughly mixed together in their passage from shelf to shelf as explained. Where the materials are to be mixed with water as they pass down through the apparatus this may by effected by water pipes so led into the interior of the main trunk or shoot and so perforated that on water being forced into the said pipes it issues from the perforations thereof, meeting the materials preferably in their descent from one shelf to another.

PROVINCIAL STOCK AND SHARE MARKETS.

CORNISH MINE SHARE MARKET.—Mr. S. J. DAVEY, mine sharedealer, Redruth (Sept. 7), writes:—Our market has been quiet nearly all the week, and not much business has been done. Wheal Agars, East Pools, Killifreths, Pedn-an-dreas, and West Setons have declined, but Cook's Kitchens, and West Kittys have improved. To-day New Cook's Kitchens and West Kittys are in demand, but other mines are dull. Subjoined are the closing quotations:—Blue Hills, 1⅝ to 1⅜; Carn Brea, 10¼ to 11; Cook's Kitchen, 42½ to 43⅝; Dolcoath, 74¼ to 74⅜; East Blue Hills, ⅛ to ⅜; East Lovell, 1 to 1⅛; East Pool, 53 to 53½; Killifreth, 5*l.* to 5*l.* 2s. 6d.; Mellanear, 4¼ to 5; New Cook's Kitchen, 6¾ to 6⅞; New Kitty, 2⅛ to 2¾; North Busy, ⅞ to 1; Penhalls, ⅜ to ⅝; Phœnix, 2¾ to 3; Pedn-an-drea, 3⅜ to 3½; South Condurrow, 9 to 9⅛; South Crofty, 11⅜ to 12; South Tolcarne, 3 to 3½; South Wheal Frances, 11¼ to 11½; Tincroft, 12 to 12½; West Basset, 9⅞ to 10⅛; West Frances, 9¾ to 10¼; West Kitty, 14⅛ to 14½; West Peevor, 12½ to 13; West Poldice, 4 to 4½; West Tolgus, 17½ to 22½; West Wheal Seton, 17¼ to 17½; Wheal Agar, 17½ to 18; Wheal Basset, 10 to 10½; Wheal Comford, 1¼ to 1½; Wheal Grenville, 10 to 10½; Wheal Jane, ⅝ to ⅞; Wheal Kitty (St. Agnes), 2 to 2½; Wheal Prussia, ⅞ to ¾: Wheal Uny, 5¼ to 5⅜.

— Mr. J. H. REYNOLDS, stock and share broker, Redruth (Sept. 7), writes:—The share market during the week has been very inanimate, and prices generally lower. Killifreths have receded to 5; West Kitty improved to 14⅛, buyers; Wheal Basset to 20⅛. Subjoined are the closing prices:—Blue Hills, 1 to 1⅜ Carn Brea, 11 to 11⅛; Cook's Kitchen, 43 to 44; Dolcoath, 74⅛ to 74¾; East Pool, 53 to 54; East Blue Hills, 10s. to 12s. 6d; Killifreth, 5 to 5⅛; Marke Valley, ½ to ¾; Mellanear, 4¾ to 5; New Cook's Kitchen, 6 to 6¼; New Kitty, 2½ to 3; North Busy, ¾ to ⅞; North Herodsfoot, 7s. 6d. to 10s.; North Penstruthal, ⅜ to ⅝; Pedn-an-drea, 3½ to 3⅝; Phœnix, 2¾ to 3; South Condurrow, 9 to 9⅛; South Crofty, 11½ to 11¾; South Frances, 11 to 11⅛; Tincroft, 12 to 12⅝; Tregembo, 3⅞ to 4⅛; West Basset, 9¾ to 10; West Frances, 9¾ to 10; West Kitty, 14⅛ to 14⅜; West Peevor, 12 to 12½; West Polbreen, ⅛ to 1; West Poldice, 4 to 4¾; West Seton, 17½ to 18; West Tolgus, 18 to 20; Wheal Agar, 18 to 18⅛; Wheal Basset, 18¾ to 18⅛; Wheal Boys, 1 to 1½; Wheal Grenville, 10 to 10½; Wheal Hony and Trelawny, 2 to 2¼; Wheal Jane, ½ to ¾; Wheal Kitty, 1⅞ to 2⅛; Wheal Peevor, 6 to 7; Wheal Uny, 5¼ to 5⅜; Wheal Prussia ½ to ¾.

— Messrs. ABBOTT and WICKETT, stock and share brokers, Redruth (Sept. 7) write:—Tin has advanced 4*l.* during the past week, but the share market has been very inactive and prices generally are lower To-day Wheal Agar and East Pool are rather pressed for sale. Subjoined are the closing quotations:—Blue Hills, 1 to 1⅛; Carn Brea, 10 to 11; Cook's Kitchen, 41 to 43; Dolcoath, 74½ to 75; East Pool, 53¾ to 53¼; East Uny, ¾ to 1; Killifreth, 5 to 5⅛; New Cook's Kitchen, 6 to 6⅛; New Kitty, 2⅛ to 2¾; New Trumpet 1 to 1¼; North Busy, ¾ to ⅞; Pedn-an-drea, 3⅜ to 3½; Santa Gertrude, 170 to 175; South Condurrow, 9 to 9⅛; South Frances, 11 to 11⅛; South Crofty, 11⅛ to 12; Tincroft, 12 to 12¼; West Basset, 9½ to 10; West Kitty, 14 to 14½; West Peevor, 12 to 13; West Frances, 9 to 10; West Tolgus, 18 to 20; West Seton, 17⅛ to 18; Wheal Agar, 17¾ to 18; Wheal Basset, 10¼ to 10½; Wheal Grenville, 10 to 10½; Wheal Jane, ½ to ¾; Wheal Kitty, 2 to 2⅛; Wheal Peevor, 6 to 7; Wheal Uny, 5¼ to 5⅛.

— Mr. M. W. BAWDEN, Liskeard (Sept. 7), writes:—The mining market has shown a slight improvement, but not in a proportionate degree to the steady advance on the tin standard. There has been an enquiry for most of the low priced promising mine shares, in anticipation of higher rates attainable, whilst several of the formerly leading and favourite mines have receded. Carn Brea, East Pool, Killifreth, South Crofty, South Frances, West Frances, and Wheal Peevor, are lower, whilst Cook's Kitchen, Gunnislake, Phœnix United, West Tolgus, Wheal Basset, Wheal Kitty, and Wheal Uny, are higher. Subjoined are the closing quotations:—Bedford United, 2½ to 2¾; Carn Brea, 10½ to 11; Cook's Kitchen, 43 to 43½; Dolcoath, 74½ to 75; Devon Consols, 5¾ to 5⅛; East Caradon, ⅝ to ¾; East Lovell, 1 to 1⅛; East Pool, 53 to 53⅛; Gawton United, ¼ to ⅜; Glasgow Caradon, ⅜ to ⅝; Gunnislake (Clitters), 3⅜ to 3½; Herodsfoot, 2s. 6d. to 5s.; Hingston Down, ⅜ to ⅝; Killifreth, 5 to 5⅛; Marke Valley, ⅛ to ⅜; New West Caradon, ½ to ¾; North Herodsfoot, ⅛ to ⅜; Old Gunnislake, ⅛ to ⅜; Phœnix United, 3 to 3⅛; Prince of Wales, ⅜ to ½; South Caradon, 13½ to 14; South Condurrow, 9 to 9½; South Crofty, 11 to 11½; South Devon United, ¾ to ⅞; South Frances, 11½ to 12, c. p.; Tincroft, 12 to 12½; West Basset, 10 to 10½; West Caradon, ⅛ to ⅜; West Frances, 9½ to 10; West Kitty, 12½ to 13; West Mary Ann, 1 to 1⅛, c.p.; West Peevor, 12½ to 13; West Phœnix, ⅜ to ½; West Seton, 17 to 17½; Wheal Agar, 18 to 18½; Wheal Basset, 10 to 10½; Wheal Crebor, 2 to 2⅛; West Tolgus, 19½ to 20; Wheal Grenville, 10¼ to 10¾; Wheal Hony and Trelawny, 2½ to 2¾; Wheal Kitty, 2¾ to 2½; Wheal Jane, ¾ to ⅞; Wheal Peevor, 6½ to 7; Wheal Uny, 5½ to 5¾.

— Mr. JOHN CARTER, mine sharedealer, Camborne (Sept. 7), writes:—The improvement in price of tin has had little, if any, effect on prices of mine shares in the Cornish market this week, and most shares remain quiet with very few buyers at quotations. At South Frances meeting to-day a loss of 6280*l.* was shown, and a call of 30s. per share made. Closing quotations are annexed:—Carn Brea, 10½ to 11; Cook's Kitchen, 42 to 43; Dolcoath, 74¼ to 74¾; East Pool, 53½ to 54; Killifreth, 5 to 5⅛; Mellanear, 4½ to 5; New Cook's Kitchen, 6 to 6⅛; New Kitty, 2½ to 2¾; Pedn-an-drea, 3½ to 3⅝; South Condurrow, 9 to 9¼; South Crofty, 11¼ to 11⅜; South Frances, 11 to 11½; South Tolcarne, 3¼ to 3⅜; Tincroft, 11¾ to 12¼; West Basset, 9¾ to 10; West Frances, 9¾ to 10; West Kitty, 14⅜ ¾ to 14½; West Peevor, 12 to 12⅛; West Poldice, 4 to 4⅛; West Seton, 17 to 17½; West Tolgus, 17½ to 20; Wheal Agar, 17½ to 17¾; Wheal Basset, 10¾ to 10½; Wheal Grenville, 10 to 10¼; Wheal Kitty, 2 to 2¼; Wheal Peevor, 6½ to 7; Wheal Uny, 5½ to 5⅝.

MANCHESTER.—Messrs. JOSEPH R. and W. P. BAINES, share brokers, Queen's Chambers, Market-street (Sept. 7), write:—In the absence of any decisive news from Egypt the policy of waiting has been observed in most departments during the past week, and as a consequence the amount of business concluded is only moderate. Nevertheless, much confidence being felt as to the ultimate issue of the campaign has caused a steady tone to prevail, and this feeling, coupled with the late favourable change in the weather, has kept the market buoyant, and induced a further general improvement in value—an improvement which, in a few instances, is fairly well maintained. Egyptian stocks have been comparatively quiet all through the week; during the early portion declining slowly; latterly, however, although with no great number of dealings marked, they have turned upwards again, and to-day quotations show very little change as compared with figures of a week ago. Values in the other classes of investments reported upon keep pretty firm all round, the business passing, however, is not of great amount. If the harvest for wheat (or that portion of it which is still ungathered) can be completed without further drawback, a better feeling in the several descriptions of miscellaneous shares may be looked for. At present, however, these may be described as quiet but steady.

BANKS.—A moderate business has been done, figures realised on dealings, as a rule, comparing favourably with those lately obtained, excepting in the cases of Manchester and County and Manchester and Liverpool District, which have changed hands a few times slightly under best points reached. The movements in quotations are few. Consolidated is 1/16 higher, but Manchester and Liverpool District are 3/8, and Manchester and County buyers 1/16, and sellers 1/8 lower.

INSURANCE.—Very few dealings are reported, there being no instance in which other than isolated transactions are marked. Prices are revised in several cases, balance of alterations being unfavourable, the adverse change, however, being in no instance of great importance.—Higher: Commercial Union, 1/8; Lancashire, 1/8; and British Re-Insurance, 1/8.—Lower: Manchester Underwriters, 1/8; Boiler Insurance and Steam-Power, 1/16; Lancashire and Yorkshire Accident, 1/16; Liverpool and London and Globe, 1/16; and Queen, 1/16.

COAL, IRON, &C., AND MINING.—No great activity on this market, and prices obtained where lots have changed hands are irregular. Quotations exhibit numerous alterations, the favourable changes being in good majority. Bolckows have been done once or twice, the fully paid marking down on dealings, whilst the 12*l.* paid have not changed. The quotations in these show reductions, more especially in the fully paid; the 12*l.* paid are lower, but the reduction is slight in comparison. In A. Knowles and Sons buyers' figure is put up again a little, but sellers have advanced their price distinctly. Nant-y-Glo and Blaina Preferred stronger, as also are West Cumberland Iron and Steel. Canadian Copper, &c., quiet, and the turn lower. Llynvi and Tondu show contradictory movements, Ordinary being enquired for and marking better, whilst the Preference record a further loss from their recent advance.—Higher: Telegraph Construction and Maintenance, 2; Rio Tinto, 1/16; Park Gate Iron, 1; Llynvi and Tondu Ordinary, 1/8; Tharsis Sulphur, &c., 3/8; Knowles and Sons, 1/4; Palmer's Shipbuilding, B, 1/4; Consolidated Telephone Construction and Maintenance, 2/16; Ebbw Vale, 1/4; Indian Glenrock Gold, 3/8; Indian Phœnix, 1/4; Indian Trevelyan, 1/8.—Lower: United States Rolling-Stock, 1/2; Bolckows, fully paid, 1; ditto, 12*l.* paid, 1/8; Sheepbridge Coal, &c., 1/8; John Browns, 1/4; Llynvi and Tondu Preference, 1/8; and Canadian Copper, &c., 6d.

COTTON, SPINNING, AND MANUFACTURING.—So far as prices have been tested figures appear to have undergone little or no change, excepting in one or two instances separately influenced.

TELEGRAPHS, with the exception of Anglo-American issues, which, though not maintaining best points reached, show distinct gain, are not much altered. They are steady all round, however, there being no instance of a decline.

TELEPHONES irregular; United's and Oriental's both better, but Lancashire and Cheshires are rather weaker. MISCELLANEOUS.—Enhanced figures are quoted in Gas Light and Coke, A ordinary, and in Hudson's Bay. Both are distinctly higher, the latter, however, have relapsed a little from the best.

RAILWAYS.—The changes during the week have been frequent and irregular: Caledonians record a rise of 1/2 (having been bought on their dividend, which is announced at 4 per cent., with 11,000*l.* over), although at one time they showed fully 1¾ up. Great Easterns have gained on their traffic, and the opening of the Northern extension. Lancashire and Yorkshire, after a rapid advance, in anticipation of greatly augmented traffics from the Preston Guild passengers, have relapsed 1 from the highest point. Some others are 1/4 to 1/2 lower, but Brighton A's are distinctly down, and some other southern lines are weaker. The feature of the week has been the continued enquiry for Canadians, which quote considerably higher, and are very firm. Americans do not show any great change on the New York market, but the enquiry here has been great, and prices have advanced sharply, particularly Philadelphia and Reading, New York, Pennsylvania, and Ohio Mortgages, and Oregon and California preference.

IRISH MINING AND MISCELLANEOUS COMPANIES SHARE MARKET.

CORK.—Messrs. J. H. CARROLL and SONS, stock and share brokers, South Mall (Sept. 6) write:—Market remains very steady, and Great Southerns changed hands at 116¼. Midlands were also done at 89¼, and Bandons at 85. No change in Macrooms or Passages. National Banks were done at 23 15-16ths, and Munsters at 7. Provincials also changed hands at 27, and Bank Stock at 318½. Cork Steam Packets were asked for at 10⅝, and Lyons shares at 5 1-16th. Dalys were offered at 2⅞, and Gas shares wanted at 6. Gouldings remain at 8¾, and Breweries at 5½. Gresham Hotels are 3*l.* 11s., and Harbour Board Debentures 102¾.

SCOTCH MINING AND INDUSTRIAL COMPANIES SHARE MARKETS.

STIRLING.—Mr. J. GRANT MACLEAN, sharebroker and ironbroker, (Sept. 7), writes:—During the past week the tendency of prices has been favourable, owing to the improving prospects of trade, and the easier tendency of the money market. Should decidedly favourable news be received from Egypt no doubt dealings would immediately become very brisk.

In shares of coal, iron, and steel companies the principal movements are favourable. In the Scotch pig-iron market the price of warrants declined to 49s. 3d., owing to the break up of the combination between the Cleveland and Scotch ironmasters for restricting production, but as it since appears that no large increase of production is likely to follow, and even there is some prospect of a new agreement being come to prices have recovered to 50s. 6d. The iron trade generally appears to be in a prosperous condition at home and abroad, stocks decreasing, and the miners are about to demand a rise of wages. The report of the Shotts Iron Company has been issued for the meeting on Sept. 13, but no dividend is declared. Including last year's balance of 8281*l.*, they have a net profit of 12,614*l.* After providing a small amount for preference dividend the balance is carried forward. They had an unfortunate legal action last year, and their make was lower last year than formerly, owing to the restricted production agreement. Clyde Coal shares advanced from 37s. to 52s., but are now easier at 47s. Speculation has been stimulated by the announcement of a meeting called for Sept. 12, to sanction the sale of this company's Spittalhill Colliery for 14,000*l.*, if no more can be obtained by auction. Llynvi and Tondu, 6½ to 7; and Newport Abercarne, 9 to 9½.

In shares of foreign copper and lead companies the principal improvement is in Mason and Barry, which advanced to 18¼; Tharsis steady at 41¼ to 41¾; Huitafail Seven per Cent. Debentures offered; Arizona are at 40s. premium Canada Copper 20s. to 21s.; Hungarian, 14s.; Panuicillo, 6⅝ to 6⅞; and Santa Cruz, 2s. 6d. to 3s.

In shares of home mines business has been quiet. Anderton Tin shares are firm, as the company is in a satisfactory condition. The mining machinery is free from debt and the prospects excellent; they have a contract by which they receive 20*l.* free out of every ton of tin sold without any deduction. Assheton are at 5s. to 10s.; Bell Vean, 10s.; Caron, 2s.; Bwich United, 10s. to 20s.; Drakewalls, 7s. 6d. to 12s. 6d.; East Chiverton, 20s. to 30s.; East Wheal Rose, 12s. 6d. to 17s. 6d.; East Craven Moor, 2s. 6d. to 7s. 6d.; Great Polgooth United, 5s. to 10s.; Grogwinion, 10s. to 15s.; Herodsfoot, 2s. 6d. to 5s.; Indian Queens, 3s. 6d.; Kit Hills, 7s. 6d. to 12s. 6d.; Leadhills, 65s. to 70s.; Mounts Bay, 5s. to 7s.; North Levant, 5; New Terras, 30s. to 40s.; Old Shepherd, 5s. to 7s.; Old Owlacombe, 1s.; Penhalls, 7s. 6d. to 12s. 6d.; Pennant, 40s. to 50s.; Rhosesmor, 55s. to 65s.; Tresavean, 5s. to 7s.; Ystwith, 2s. 6d. to 5s.; Walkham United, 5s. to 10s.; West Lisburne, 7s. 6d. to 12s. 6d.; West Pateley, 2s. 6d. to 5s.; and Wheal Kitty, 40s. to 45s.

In shares of gold and silver mines there has been more business doing, and the time is now more favourable for operations at the Indian gold mines. Richmond exceptionally lower at 8⅛. California wanted, but Golden Crown, Imperial Crown, Mariner's Reef, and Sir John Moore are all offered. Akankoos are at 5s. to 7s. 6d.; Australasian, 2s. 6d. to 5s.; Cedar Creek, 2s. to 3s.; Colorado, 27s. 6d. to 32s. 6d.; Gold Coast, 17s. 6d. to 22s.; Hoover, 3s. 9d. to 6s. 3d.; Indian Consolidated, 14s. to 16s.; Indian Kingstons, 5s. to 7s.; Isabelle, 7s. 6d. to 12s. 6d.; Kapangas, 15s. to 17s. 6d.; Kohinoor, 17s. 6d. to 22s. 6d.; New Gold Run, 4s. 6d.; ditto (pref.), 3s. 6d.; Nouveau Monde, 6s. to 8s.; Olathe Silver, 5s. to 10s.; Plumas Eureka, 30s. to 32s. 6d.; Simons Reef, 6d.; Sierra Buttes, 27s. 6d. to 30s.; Silver Peak, 2s. to 4s.; United Mexican, 17s. 6d. to 22s. 6d.

In shares of oil and miscellaneous companies prices are steady. Lawes' Chemicals, 6¼ to 6½; and Price's Patent Candle, 12¼ to 13¼.

EDINBURGH.—Messrs. THOMAS MILLER and SONS, stock and share brokers, Princes-street (Sept. 6), write:—The fluctuations in prices of home railway stocks have all been moderate. Among Scotch stocks Glasgow and South-Western have risen most, the improvement being from 121½ to 123¼. North British has improved from 92⅝ to 92¾. Caledonian from 107¼ to 108⅜. Great North of Scotland from 56¼ to 57. Highland has receded from 104¼ to 103. Great Eastern has advanced from 72⅞ to 75. Railway Investment Deferred from 39 to 39¾. Caledonian Four per Cent. Preference No. 2 has improved from 104 to 104¾. Ditto Four per Cent. Annuities No. 1 from 105 to 105. Edinburgh and Glasgow Preference from 113¼ to 114. Canadian have been very strong, and a considerable business has been done in them. Grand Trunk Ordinary has advanced from 21 15/16 to 23¾. Second Preference from 94½ to 97½. Third from 47¼ to 51⅝. Great Western of Canada shares from 14½ to 15 5/16. Americans are generally better. In banks, Commercial Bank shares have receded from 52½ to 52. Clydesdale have risen from 23 to 23¾. Insurance shares have been dull. In colonial property companies Ceylon Investment shares have receded from 23s. 6d. to 20s. Hudson's Bay have risen from 32¾ to 36. Mining shares are not much changed, with the exception of Clyde Coal, which have fluctuated violently; these shares which stood at 38s. a week ago rose to 52s. 6d., from which they have fallen again to 45s. 6d. Steel Company have risen from 7¾ to 8 1/16. Oil shares have been steady, with the exception of Midlothian Oil, which have receded from 7s. 6d. to 15s. discount.

EXTENSIVE MINING OPERATIONS IN SCOTLAND—EXTRAORDINARY WATER-PUMPING.—About two years ago the Alloa Coal Company resolved to resume mining operations in the old mines of Devon Ironworks, which are situated about midway been Alloa and Alva. Coal had been worked on a somewhat extensive scale at Devon as early as the beginning of the present century, but operations were entirely suspended somewhere about 1854. The pumping engines on the Furnace Bank and other pits were stopped, and the enormous waste extending for miles to the south and east and west of the works was allowed to fill with water. When the company came to the conclusion to pump out this water and again commence coal working in the district the undertaking was looked upon by mining men of great experience as being one of the most gigantic which had ever been tackled in Scotland. In the month of June, 1880, the management of the concern (under Mr. Roxburgh, the general superintendent for the company) was placed in the hands of Mr. Moodie, a Fife manager, who had had a great amount of experience in pumping operations. A powerful beamed engine, similar in every way to the ill-fated Hartley machine (which played so much havoc in 1862), which had been erected in 1854, on the Furnace Bank Pit, by Neilson and Son, engineers, Glasgow, was soon repaired and set a agoing. Other pumping engines were brought into requisition, and for some time it was computed that no less than 8,000,000 gals. of water were brought to the surface every 24 hours. Notwithstanding the enormous growth of water arising from a very wet stratum, this rate of pumping soon began to make headway in what was nothing short of an ocean. The work had, however, been commenced little more than six months when Mr. Moodie, the manager, was by an unfortunate accident knocked from a scaffold in the shaft, and he fell into no less than 50 fms. of water. Ere the top of the water was reached he had sunk to the bottom, and as the result, his body was not recovered until the water had been pumped out. His responsible post was pluckily accepted by his eldest son, Mr. Thomas Moodie, then of Leven Colliery, Fife. Under Mr. T. Moodie's management the water continued to decrease, and by May, 1881, the bottom of the Furnace Bank Pit was reached. This was certainly much sooner than was anticipated—the feat being referred to by one of Her Majesty's Inspectors of Mines as being one of the most extraordinary—if ever paralleled—which had come under his notice in Scotland. After the water was pumped out it was found that the seams of coal had been a good deal worked to the rise or south. Accordingly, the Furnace Bank Pit has been sunk an additional 180 ft., making the shaft in all 110 fathoms; and now a capital hold of the upper 5-ft., 9-ft., and lower 5-ft. seams has been obtained. A lease of the coal fields extending from the pits to the foot of the Ochils, and east and west for many acres, has been obtained, and with fair prices the speculation promises to be a profitable one. The seams range from 3½ ft. to 6 ft. in thickness, and are stated to be of excellent quality. The coal will be worked on the stoop-and-room system, and being chiefly "dook" workings, machinery of the very best type, pumping and winding, will be erected in the bottom of the shaft. A pair of coupled winding-engines, capable of raising 500 to 600 tons of coal per day of eight hours, has been placed on the bank of Furnace Bank Pit. The maker of the engines was Mr. Andrews, Kilmarnock. A ton of coal is raised every load. Close to this pit No. 2 shaft has been sunk. A rarefying air fan of very large dimensions has been placed on this pit, and while it will form the upcast shaft of the colliery coals will also be brought up by it. A winding engine, supplied by Messrs. M'Culloch and Son, Kilmarnock, similar to that at the Furnace Bank Pit, has been erected. At the Crosshill Pit one of the old shafts, a new pumping-engine, with a 60-ft. cylinder and 12 ft. stroke, has been fitted up. The pumps are 24 ft. in diameter, and the water is brought to the surface by two forcing and two lifting sets. Here a capital winding-engine has also been erected. Both machines were supplied by Mr. Andrews, Kilmarnock. Altogether the colliery promises to be one of the largest in Scotland. The success of the undertaking is no doubt due in a great manner to the skill displayed by Mr. Roxburgh and the manager, Mr. T. Moodie.—*Glasgow Herald.*

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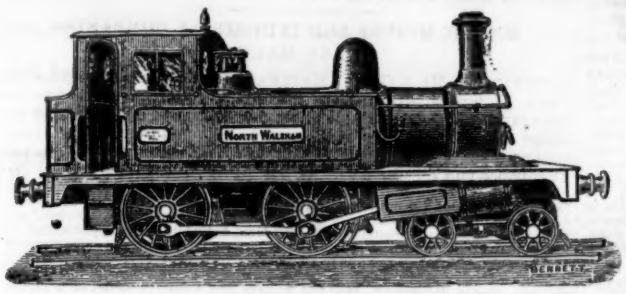

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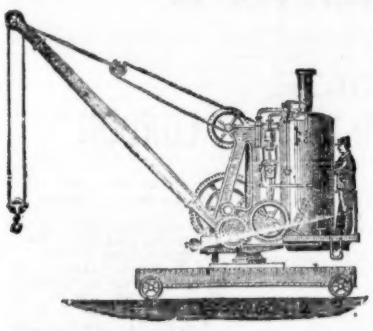

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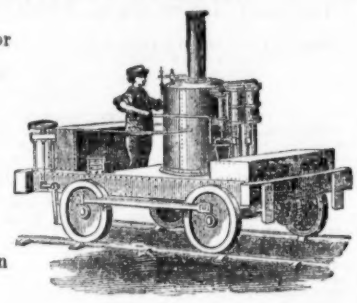

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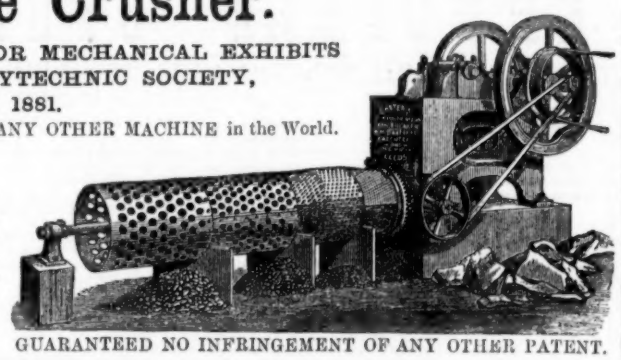

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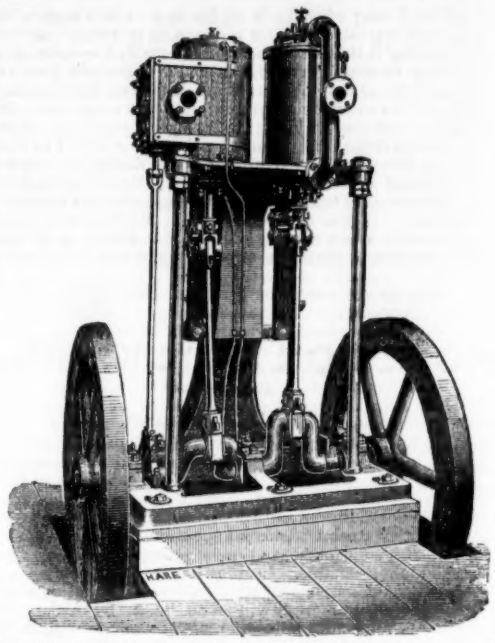

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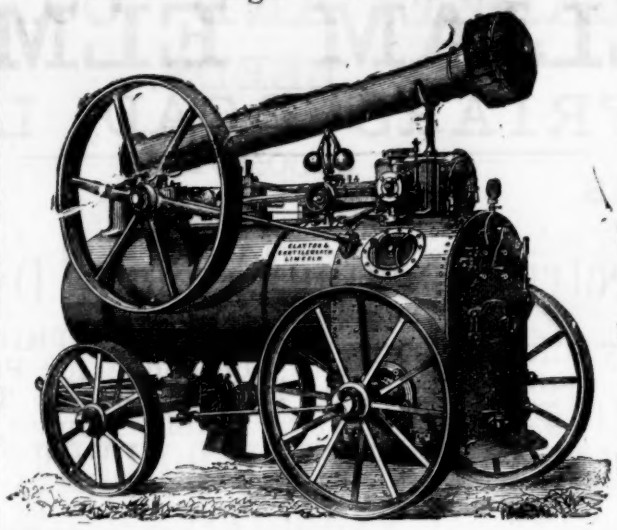

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For depositing **Gold, Silver, Nickel, Bronze, Zinc,** &c., in **Electro-Plating.**

SPECIALITIES.

THE

"Elmore" Dynamo-Electric Machine

For ELECTRIC LIGHTING (Arc and Incandescence) for Public Streets and Gardens, large Open Spaces, Theatres, Factories, Workshops, Hotels, Houses, &c.

ENTIRE SYSTEM COMPLETE, EFFICIENT, AND INEXPENSIVE.

Special Apparatus for the application of Ozone and other Gases for Bleaching Oils, Sugars, Fabrics, &c.

Complete Outfits. The **Elmore" Machines and appliance for** TIN-PLATE MANUFACTURE.

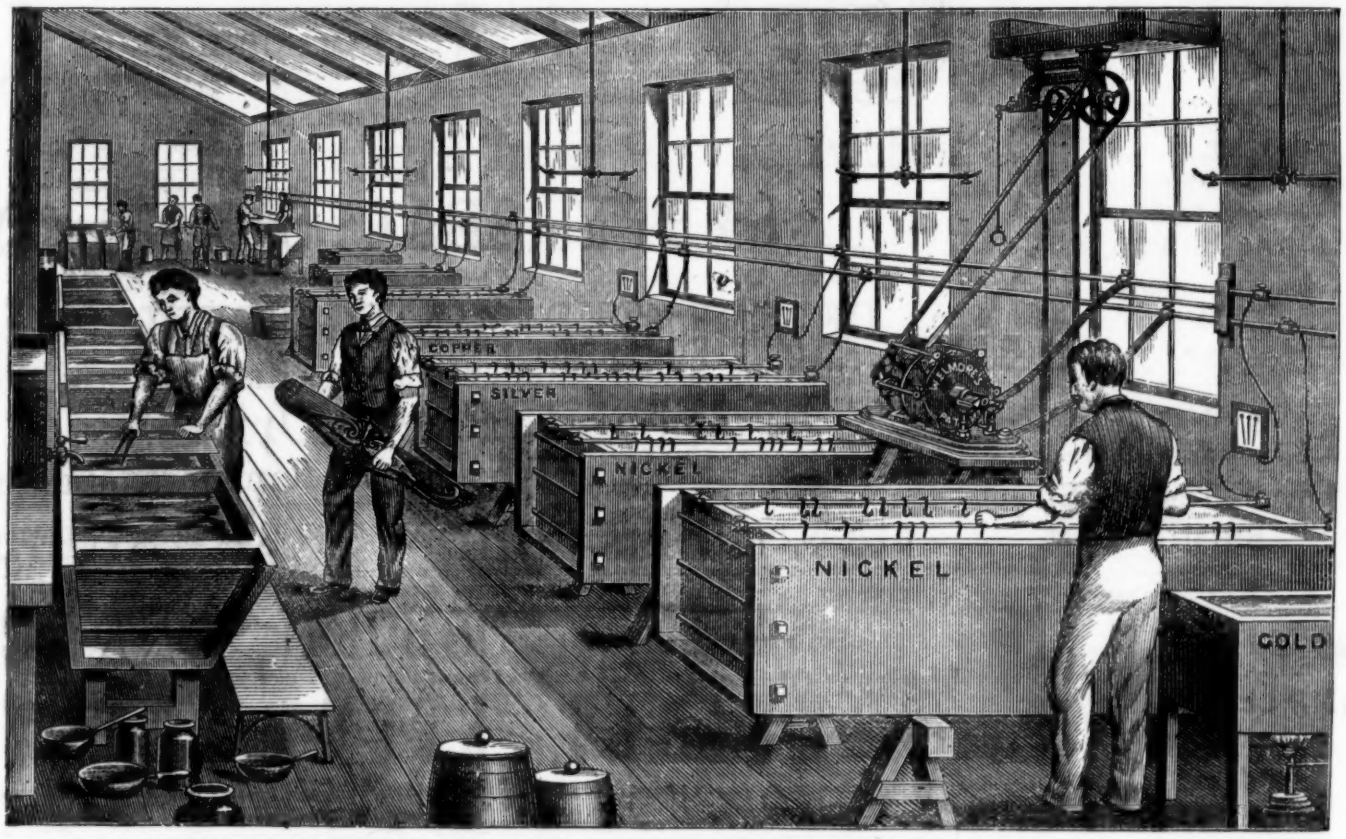
Complete Outfits. The **"Elmore" Machines and appliance for** GALVANIZING.

Complete Outfits. The **"Elmore" Machines and appliance for** REFINING METALS

Complete Outfits. The **"Elmore" Machines and appliance for** EXTRACTING METALS FROM ORE,

Complete Outfits. The **"Elmore" Machines and appliance for** GENERATING OXYGEN, Hydrogen, Chlorine, Ozone, and other Gases.

COMPLETE WORKING INSTRUCTIONS FURNISHED.



The above represents an Electro-Plating Works in which an "ELMORE" PATENT DYNAMO-ELECTRIC MACHINE is being used for the simultaneous deposition of Nickel, Silver, Copper, Bronze, Brass, Gold, Tin, Zinc, &c., from their Solutions.

COMPLETE WORKING OUTFITS SUPPLIED.

TESTIMONIALS, &c.

From the "HARDWARE TRADE JOURNAL."
A MODERN PLATING ESTABLISHMENT.

"Mr. WILLIAM ELMORE, of 91, Blackfriars Road, London, S.E., is busily engaged fitting up the Art Metal Depositing Works of the Electrolytic Company, Charlotte Street, Blackfriars. The Electro-plating tanks of nickel, copper, brass, zinc, and tin, holding several thousands of gallons each (worked by an 'Elmore' Patent Dynamo-Electric Machine, capable of depositing about 500 lbs. of metal per day), and the specially designed and constructed polishing machinery will all combine to constitute this most gigantic and complete arrangement of the kind in the world. Here boiler tubes, each over 20 ft. in length, may be coated with copper, large ornamental iron lamp posts, and similar massive iron structural objects of great weight may be covered with electro-deposited copper, forming, when finished, a complete shell of bronze, which may be nickel-plated, or even silver-plated, if desired. Large rough or polished iron surfaces may be coated with brass, or zinc, or tin. Copper electrotype copies are taken of art subjects, the reproduction being so perfect that the process is used for multiplying plates from which bank-notes are printed, and the most delicate ferns, flowers, leaves, and insects are coated with copper, and afterwards with gold, silver, nickel, &c., for use as ornaments of various kinds. Fenders, fire-irons, grates, &c., may be brassed. The largest marine engines may be nickel-plated in the large nickel-plating plant, worked by the powerful 'Elmore' machine with ease and certainty, which only a few months since would have been pronounced almost impossible. The Electrolytic Company, we understand, express perfect satisfaction with the work already completed by Mr. Elmore, and there is no doubt that with that gentleman's large practical experience the company could not have been in better hands. The entire premises will be lighted by the 'Elmore' system of electric light."

From the "LONDON MINING JOURNAL."

"The new 'Elmore' Dynamo-Electric Machine can be seen in operation in London, and is considered one of the most wonderful scientific apparatus which has yet been brought before the public; it should be inspected by all whoare interested in any kind of metallurgical operations."

"Mr. ELMORE has just received two pieces of ordnance from Her Majesty's Works at Chatham, with an order to nickel-plate the same, together with the carriages upon which they are mounted. Mr. Elmore has done similar work for the Government on previous occasions, and it will be remembered that the screw propellers used on the torpedo boats were nickel-plated by him. The 'Elmore' Dynamo-Electric Machines and complete electro-plating outfits have been supplied to Government Departments at home and abroad."

From the NICKEL PLATING COMPANY,
13, GREEK STREET, SOHO.

". . . . . Your Machine does *its work most satisfactorily, and has never once reversed current,* which the Weston Machine frequently did." . . . . .

From the ELECTROLYTIC COMPANY,
ART METAL DEPOSITING WORKS,
CHARLOTTE STREET, BLACKFRIARS, LONDON.

"The *'Elmore' Dynamo-Electric Machine* and entire outfit which you have supplied to this company have given perfect satisfaction." . . . . .

From the NICKEL AND SILVER PLATING WORKS,
2, CHARLES STREET, CURTAIN ROAD, E.C.

"Having had one of the *'Elmore' Patent Dynamo-Electric Machines* in constant use for several months, it gives me great pleasure to say that with it I have been able to deposit four times the weight of metal per day which I had been enabled to do with the Dynamo-Electric Machine, which it has displaced in my establishment." .

From the LONDON NICKEL PLATING COMPANY.

"We have much pleasure in expressing our entire satisfaction with the nickel-plating solution, anodes, and Dynamo Machine that you have supplied us with.

From the DYNAMO-ELECTRIC PLATING WORKS.
2, OLD SWAN LANE, LONDON.

"The quality of the nickel solutions and anodes at these works, which were supplied by you, is most satisfactory in every way. . . . . The Dynamo Machine also works excellently, and has given no trouble whatever since it has been started."

AND MANY OTHERS.

Dynamo-Electric Machines, Outfits, &c., supplied to (London) Messrs. Thos. De la Rue and Co., Cassell, Petter, and Galpin, The India Rubber Company (Limited), Silvertown, The Nickel Plating Company, Joseph Woodricka, Kelly and Co., A. S. Cattell and Co., &c., &c., (Birmingham) Messrs. Wright and Butler, Joseph Woodward, The Griffin Gilding and Plating Company, and over 500 others.

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ORIGINAL PATENTEE AND ONLY MAKER.

H. R. MARSDEN,

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NEW PATENT FINE CRUSHER OR PULVERIZER,

FOR REDUCING TO AN IMPALPABLE POWDER, OR ANY DEGREE OF FINENESS REQUIRED,

GOLD QUARTZ, SILVER, COPPER, TIN, ZINC, LEAD,

AND ORES OF EVERY DESCRIPTION;

Also Cement, Barytes, Limestone, Chalk, Pyrites, Coprolite, &c., &c. These Machines are in successful operation in this country and abroad, and reference to users can be had on application.

PATENT REVERSIBLE CUBING and CRUSHING JAWS, IN FOUR SECTIONS,
WITH PATENT FACED BACKS, REQUIRING NO WHITE METAL IN FIXING.

NEW PATENT CRUCIBLE CAST-STEEL CONNECTING RODS.
NEW PATENT RENEWABLE TOGGLE CUSHIONS, &c.

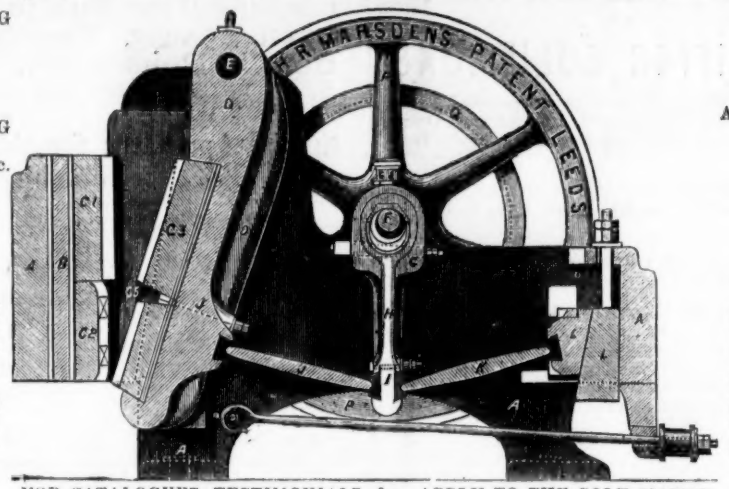
OVER 4000 IN USE.

EXTRACT FROM TESTIMONIALS.
PULVERISER.

"I have great pleasure in bearing testimony to the merits and capabilities of your patent combined fine crusher and sieving apparatus. I have tried it on a variety of ores and minerals, and it pulverizes them with equal success. You can put in a small paving stone, and bring it out like flour."

"The power required to drive it is very small, being from 4 to 5-horse, and the repairs are almost nil."

"I am sure the machine will be a success, and a great one, and there is any amount of demand for such a machine. We can work it with 20 lbs. of steam, and our engine, which is a 12-h.p., plays with the work, in fact we un the Stonebreaker and the Pulveriser both together with 35 lbs."



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ROAD METAL BROKEN EQUAL TO HAND, AT ONE-TENTH THE COST.

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"The 15 × 8 stonebreaker gives perfect satisfaction. It produces a more cubical stone than any others I have seen at work."

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"Your 10 × 7 crusher at the Aruba Gold Mines will crush 90 to 100 tons per 24 hours of the hardest gold quartz to 1 'size.'"

"Some of your testimonials do not give your machines half their due. I have seen men hammering away on a big rock for a quarter of a day which your machine would reduce to the required size in a quarter of a minute. I would guarantee that your largest size machine would reduce more of the Cornish tin capels (which is the hardest rock of England) in a day than 200 men, and at 1-25th the cost."

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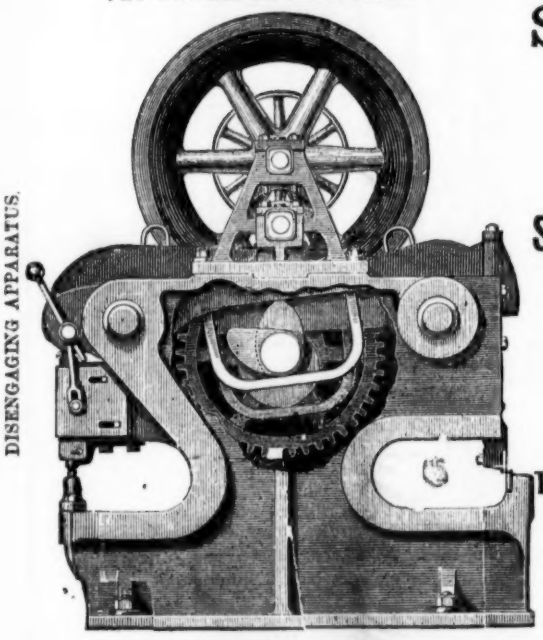

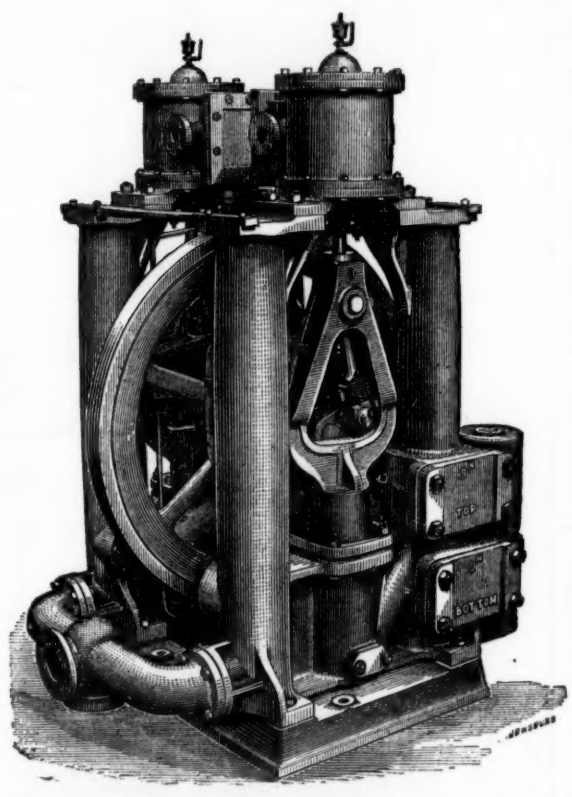

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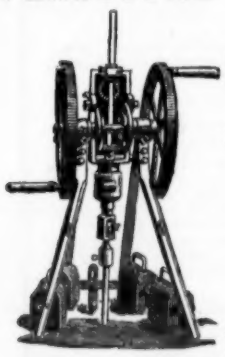
FOR HAND-LABOUR ONLY,

IN HARD ROCK.



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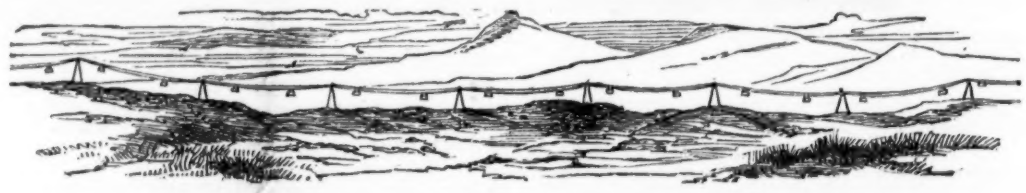

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